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SOME HISTORICAL ASPECTS OF SCIENTIFIC WORK AT DENISON UNIVERSITY[1]

WILLIS A. CHAMBERLIN[2]

The honor of speaking at this first conference in commemoration of the one hundred and twenty-fifth anniversary of the founding of Denison University is deeply appreciated and I am happy to meet with the faculty and friends of the College on this occasion.

The historical aspects of scientific work at Denison signify in this instance my impressions of the professors of science, most of whom I knew personally as my instructors or as colleagues. My review of them is a sort of *Who Was Who in Science at Denison*, for all these men, with one or two exceptions, have completed their earthly careers.

The subject contemplates the period of approximately a half-century, from 1870 to the outbreak of the first World War. In that time the College expanded, at first gradually and later in accelerated pace, in material resources and academic attainments. Particularly the work in science is an index of that development, as it rose from a place of inferiority in the curriculum to the position of eminence which it won in the first decades of the present century. My aim is to present to you briefly the men who were chiefly responsible for initiating and directing this robust growth.

With these limitations in mind let us proceed with our account.

The modern methods of teaching science were introduced at Denison by Professor Lewis E. Hicks. An alumnus of the College, class of 1868, he had caught the spirit of the objective approach to nature in graduate study at Harvard under the renowned Agassiz. He became professor of natural science in Denison in 1870. He led his students in field trips and in laboratory study of the specimens they gathered. Of this new experience an editor of the *Denison Collegian* wrote:[3]

> Since the return of Professor Hicks an entirely new system of instruction has been inaugurated. It is evidently a maxim of the Professor, never to accept from a book anything you can acquire by observation. He takes them to a stone quarry, and Black Hand and Flint Ridge for their Geology and sends them to the creek and fields for their Natural History. He has inspired them with a surprisingly ardent devotion to the cause of science.

Professor Hicks remained here until 1884, when he was called to the professor-

[1] A public address presented at a commemoration dinner at Denison University on March 9, 1956.

[2] Professor Emeritus of Modern Languages, and College Historian. Denison, Class of 1890.

[3] Denison Collegian, November, 1870.

Plate 1.

LEWIS E. HICKS

Professor of Geology and Natural History, 1870–1884.

Denison University

(Photograph supplied by courtesy of The American Baptist Foreign Mission Society.)

ship of Geology in the University of Nebraska. Testifying to the high regard for him, the *Denison Collegian* remarks:[4]

> His name has long been ranked in the list of Ohio's distinguished educators, and in his special line of geological research he has few peers.

He gave his extensive collection of geological and botanical specimens to the College.

In 1883 the department of Chemistry and Physics was added to the curriculum and Isaac Osbun was appointed to the new position. He was well qualified for this work. After graduating from Denison in 1872 he spent the following year in teaching and then two years, 1873–75, in graduate study in Germany at the Universities of Tuebingen and Heidelberg. At the latter he studied under Bunsen. On his return to the United States he taught seven years in the State Normal School in Salem, Massachusetts, whence he was called to Denison. With this rich experience in study and teaching he entered upon his work here with great enthusiasm and bright prospects. But his eminent career was cut short after only a year and one term by his untimely death at the age of 34. This was a heavy blow to the College and community. In a tribute to him in the *Denison Collegian* it is written:[5]

> As a teacher he attained the very highest success, and this success which crowns his life was the legitimate reward of straightforward, earnest, well directed and persevering toil. He magnified his work, and the results of his work, written in the minds and hearts of those whom he taught, constitute a monument to him more enduring than granite.

An editorial in the same issue of the *Collegian* notes the deep impression made on the College by his work in science:

> He has been on the field a little more than a year, and a revolution has already been wrought, whose effects will be seen in all coming years. Never again under any circumstances can the work of this department be what it was before.

These two men, Professors Hicks and Osbun, who were lost to Denison in 1884, laid enduring foundations for the great advancement of scientific study in the institution.

To fill the vacant positions two young men were called from opposite points of the country: Clarence Luther Herrick from Minnesota and Alfred Dodge Cole from New England. Both were in the middle twenties in age. Professor Herrick was graduated from the University of Minnesota in 1880 and subsequently had worked on the Geological and Natural History Survey of the state under Professor N. H. Winchell. In fact, he was preparing a report on the mammals of the state when the call to Denison came. He had spent the year 1881–1882 at the University of Leipzig, where he had learned the refined technical methods of German scholars. As his department in Denison included Geology and Natural Science, he was warranted in pursuing his interest in all natural

[4] *Ibid.*, September 27, 1884.
[5] *Ibid.*, January, 1885.

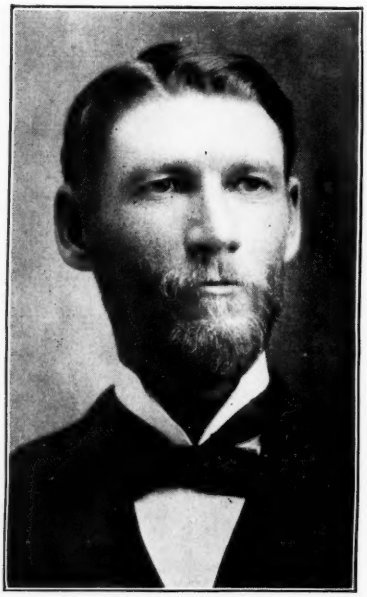

Plate 2.

CLARENCE LUTHER HERRICK

Professor of Geology and Natural History, 1885–1888.

Professor of Biology, 1892–1897.

Denison University

phenomena. To orient himself in the geological resources of this vicinity he made trips to Flint Ridge and all parts of Licking County and to different places in the state, guided, perhaps, at first by August Foerste, a Denison student who was familiar with this region. They collected many fossils and noted significant marks of glaciation.

Professor Herrick, as I remember him, was tall and slender with a thin face framed in bushy side-whiskers. That way of trimming the beard must have been a popular fashion, as I recall several professors and the Baptist pastor with beards in this style. He was an indefatigable worker and his diligence combined with his keen intelligence enabled him to accomplish so much in his short life. He was very adept in free-hand drawing, which he used to practical advantage in illustrating his lectures and scientific articles. He was ambidextrous, using both hands in sketching on the blackboard. On one occasion he gave a public lecture in Granville on the subject of evolution. Some people, he said, found an argument against evolution in the structure of the horse's hind legs, which were of the opposite shape to the human leg. Quickly and deftly he drew a picture of the horse's leg showing the knee joint in the thigh, jointed like the human knee, the ankle at the hock. The horse walks, as he said, on his toe-nail. It was an obvious answer to the objection to evolution.

Everyone agrees that Professor Herrick was an inspiring teacher. His interest in science was unlimited and was as natural to him as eating and sleeping. From his high-school days, when he organized the Young Naturalists Society that held weekly meetings to discuss scientific subjects, he had a boundless curiosity to know the cause and reaction of natural phenomena. His interest included the whole field of natural science. While he did not delve so deeply into some areas as the specialist would desire, his investigations were the spade work for many a later scientist. His matchless love of nature in her varied manifestations was imparted contagiously to his students, who became his ardent disciples. How I regret that I did not have the opportunity to study under him. Only a smattering of science was offered in the Classical Course, to which I belonged. When the time came to take his course in Zoology in the senior year, he had resigned and removed to the University of Cincinnati and so I lost my chance. On his return to Denison in 1892 as professor of Biology, after another visit to Germany, I was teaching here and I knew him from that angle.

I believe he was very happy to return. Mr. Barney had made his generous offer to build the Science Hall, which would give Professor Herrick room for his laboratories and collections and the prospect was alluring. He spent much time in planning the new Hall and looked forward to many years of research and teaching. Denison entered an era of progress under the administration of President Purinton, which was symbolized by the rise of Barney Science Hall. The hopes of all of us rose high as we contemplated this material advance. Just before the completion of the building, which he had watched with expectant eyes, he suffered an attack of the "flu". This would ordinarily not have been too serious, if he had yielded to it and remained at home for a week. But in his characteristic way he did not spare his strength during this illness, but con-

tinued his work until he was bowled over. I have a vivid picture of him as he was carried in an arm-chair to visit the building about the time of its completion. Perhaps it was to oversee the moving of his laboratories and materials to the new place. He compared himself to Moses on Mount Nebo viewing the Promised Land, which he was destined never to enter. It was Professor Herrick's heart-breaking experience never to enter the new building for his work, for incipient tuberculosis developed and he was forced to leave Granville for a milder climate. If he had possessed the patience to rest and recuperate his health, his life might have been extended many years. But rest was foreign to his nature. He would rather wear out than rust out, as he said. He spent the last ten years of his life in New Mexico, where he engaged in mining activities and as President of the territorial University. He died in Socorro, New Mexico, in 1904, a few months past forty-six years of age.

During his short tenure of office here he organized two enterprises which offer perennial testimony to his initiative and courage. They are the *Denison Scientific Association*, founded in 1887, and the *Bulletin* or *Journal of the Scientific Laboratories of Denison University*. One aim of the Association was to encourage the students to investigate and discuss their personal projects in science. 27 charter members joined the Association at its first meeting. I was only a freshman, toiling over Latin and Greek, and did not foresee the value of this opportunity, or I might have been among the immortals. Years later I became a member and attended the meetings quite regularly.

The *Bulletin* began publication in December, 1885, and in the seventy years of continuous publication has gained international recognition. It goes in exchange to American and foreign scientific societies and scientists all over the world.[6]

The *Journal of Comparative Neurology*, which he also undertook at his own financial responsibility, put out its first number while he was professor in the University of Cincinnati in 1891. But as he returned to Denison the next year and continued the *Journal* with a small subsidy from the College, it may fairly be included with the other fruitful enterprises of his Denison years. It led a precarious existence the first few years, but soon attracted international attention and was securely established. It issued its hundredth volume in 1954.[7] The ownership of the *Journal* was transferred by sale to the Wistar Institute of Philadelphia in 1908.

Professor Alfred D. Cole, who came to teach in Denison in the same year as Professor Herrick, was from the cultured old town of Beverly, Massachusetts. He won highest honors of his class at Brown University and was the valedictorian. After a year of graduate study in Johns Hopkins, where he worked with

[6] August Foerste: *The Earlier History of the Bulletin of the Scientific Laboratories of Denison University.*

[7] C. Judson Herrick: *Clarence Luther Herrick, Pioneer Naturalist, Teacher, and Psychobiologist;* Transactions of the American Philosophical Society, New Series, Vol. 45, Part I, pp. 71 ff, 1955. C. Judson Herrick: *One Hundred Volumes of the Journal of Comparative Neurology;* Jour. Compar. Neurol. 100, pp. 717–756, 1954.

the world famous physicist, Professor Henry A. Rowland, he came to Denison as an instructor, and after a year or two was promoted to the Henry Chisholm chair of Physics and Chemistry. He possessed the graces of a New England training; he was gentle-speaking, courteous and self-controlled. His laboratory and class-room were in the East Hall of Talbot, a very limited space. My course under him was only a beginner's class in Chemistry which was conducted with "lectures and demonstrable experiments", according to the catalog. The demonstrating was all done by the professor, while we students "looked and listened". A more vivid impression was left on my mind by a "demonstrable experiment" which he invited a small company of his friends to witness in his home. This was after he had married the beautiful daughter of one of Granville's first families, Emily Downer, and had established his home in the Avery-Downer mansion (presently the Kappa Sigma House). We came to this party expecting to see a novel experiment in Chemistry. It was novel, but not what we expected. After a time of social chat a chafing-dish was brought in and the Professor prepared before our eyes a delectable "Welsh rarebit". Accompanied by other dainties this was passed around and we sampled it with much delight. It was a perfect experiment.

My course in Physics under Professor Cole consisted mainly of the study of electricity and magnetism. The generator of electricity was a small apparatus consisting of a glass disc mounted on an axle with a crank. It would develop a current when revolved rapidly by hand. Professor Cole remained for sixteen years of successful work at Denison, including a year's leave of absence in 1894–5 spent in Germany. He co-operated with Professor Herrick in establishing the *Denison Scientific Association* and made his department a valuable and popular branch of the curriculum. In his professorship of Physics at the Ohio State University, to which he was called from here, he was equally successful and had wider acclaim than was possible with the fewer students in Denison.

The reputation of our College in scientific work was established by these two professors. Through them Denison attained high rank among learned men. On the authority of Professor C. Judson Herrick,[8]

> Denison claims to have trained more great men of science than any other liberal arts college of its size in this country, and this enviable record began seventy years ago when my brother (Professor C. L. Herrick) and A. D. Cole were the only scientific members of that small faculty.

Professor Cole generously attributed this achievement to his colleague. In a tribute to Professor C. L. Herrick he declared:[9]

> I cannot think of one other man who so powerfully impressed those with whom he came into any sort of contact with a real longing to find out new truth by their own effort and add it to the legacy of knowledge which the present generation has inherited from the past. His

[8] Charles Judson Herrick: *Clarence Luther Herrick*, Transactions of the American Philosophical Society, New series, Vol. 45, Part I, 1955, p. 37.

[9] *C. L. Herrick as a maker of scientific men.* Bull. Sci. Lab., Denison University, 13, pp. 1–13, 1905.

own work as an investigator was great; his work as a maker and trainer of investigation was perhaps greater.

To back up these statements several men come to mind who attained excellence in science. I will speak of some of them and if I omit others who are worthy of mention it is because of the limitation of time or that I am less familiar with their work. First comes to mind August Foerste who, as an undergraduate in Denison, had made extensive exploration in Geology in this area when Professor Herrick came. Foerste was entirely devoted to Geology; it seemed to be all that he thought of. Although he had chosen the classical course in Denison it was obviously an incongruous place for him. He had put off the study of Greek as long as possible and thus as a senior he was in the class with me in my freshman year. It was painful to see him floundering around in his attempt to translate a Greek sentence. But in science he was outstanding. He taught Geology for many years in the Dayton Steele High School and was also engaged in government surveys.

Closely associated with Professor Herrick as student and teacher was William G. Tight of the class of 1886. He specialized in Geology and was my instructor in an elementary course in that subject. In our study of geysers he made a contraption to demonstrate this natural phenomenon. It consisted of a wooden frame 10 to 12 feet high, supporting a reservoir of water at the top with a pipe leading to an outlet lower down. It did not work quite right at first, but was adjusted finally to demonstrate the intermittent flow of a geyser. He took as his special problem of research the location of preglacial drainage of Ohio and spent several summer vacations in trips about the state to make borings in various localities to determine the water level and the nature of the earth strata. He proved effectually, I believe, that the course of the Ohio River was radically changed by the glaciers and that some of its tributaries in preglacial epochs flowed in the reverse direction to their present course.

He succeeded Professor Herrick after the latter had gone to the University of Cincinnati. I recall two exercises that I had to do in my one term of Zoology with him. The first was the dissection of an earthworm and the study of its organs. I had sacrificed many earthworms for fish bait in my boyhood, but I confess that to dissect one was a difficult and distasteful task. It was a mess. My "reverence for life", in Schweitzer's phrase, has become so acute, that after the lapse of so many years I have pity for that miserable worm, victim of my clumsy technique. The other exercise was the study and drawing of a star fish. This was not so unpleasant, as the fish was dead and dried up. I could handle it easily. In my note-book, which we kept and handed in to the professor for his inspection, I made a careful drawing life size of this specimen; and it was the principal piece, the *chef-d'oeuvre*, of my book.

Professor Tight was a versatile genius. One of his hobbies was bicycling. The bicycle of that period, found now only in museums, had a tall wheel in front connected with a little wheel behind. He had a 60 inch bicycle, i.e., one with a front wheel five feet in height. Several of us students had bicycles and we organized a club with Professor Tight as leader and we practiced riding abreast

and in column on Beaver Field. One of our stunts was to spring from the ground into our saddles and start off without losing our balance in alignment across the field. It seems impossible to me now, but we learned to perform it and in an exhibition of riding at the college field-day we executed it in good form. Professor Tight was inventive. Not satisfied with riding alone on his bicycle he made a tandem of it by rigging up a saddle over and forward of the small rear wheel, on which Mrs. Tight could ride. And behind that, above a rear fender, he attached a second seat for the use of their small child. In this contraption the whole family could thus enjoy a ride together. After all the bruises and scratches that I got from sudden plunges from my wheel, I would not have dared to risk my family's security on such a vehicle; but I never heard that the Tights had any accident with it.

Professor Tight is remembered for inaugurating the community project by which Sugar Loaf was transformed from a bleak hill into an arboretum and town park. College and town united in this ambitious effort. On Arbor Day of 1896 scores of citizens and students armed with spades and mattocks swarmed over Sugar Loaf and planted young trees commemorating societies, churches, college classes, fraternal organizations and family groups. By nightfall hundreds of trees were transplanted from forest and nursery to their new setting on the hill sides and a road from West Broadway was marked out, winding around the steep slope to the summit. The trees flourished and in a year or two clothed old Sugar Loaf with verdant foliage.[10]

Professor Tight followed his former chief at Denison, Dr. Herrick, to the University of New Mexico, and succeeded him there as President of the University. Near the entrance of Granville's Maple Grove Cemetery stands an enormous granite boulder engraved with his family name. It seems to me a most appropriate symbol of his rugged character.

In Professor Herrick's group of students we should certainly not omit mention of his younger brother, Charles Judson Herrick. Ten years younger than Clarence, he followed him to Denison first as student and later as his successor in the professorship of Zoology. Of his efforts to reach his brother's high standards of teaching and also of editing the *Journal of Neurology* he has given too modest an account in his biography of Clarence. He has a brilliant record in both teaching and research. While teaching in Denison he completed his doctorate at Columbia and won twice the Cartwright Prize for preeminent research. He spent several summers in the marine laboratory at Woods Hole, Massachusetts, and later in a small laboratory which he fitted up around Chapin's Spring at the foot of Sunset Hill on our campus. It was facetiously called "Woods Hole Junior". It had a small shed to shelter his table and microscope, standing beside a pool in whose clear, spring water he could observe the behavior of the fish which he was studying. Occasionally on warm sunny days he relaxed from his studies to entertain two or three of us with a picnic. If Professor Malcolm Stickney was one of the guests, he was sure to furnish beans baked in a bean-pot buried in the ground and surrounded with live coals, according to the fashion in

[10] See *The Granville Times* of April 23, 1896.

his native state of Maine. Never have baked beans tasted more delicious than those eaten at the little laboratory *al fresco*. As instructor, assistant-professor and professor of Zoology in Denison, Professor Charles Judson Herrick continued the work begun by his brother, until he was called to the University of Chicago. He is famous for his research in Comparative Neurology. After retiring from the University of Chicago he removed to Grand Rapids, Michigan. In occasional letters from him he reveals that he is still busy with study and writing. His recent biography of his brother Clarence is a reliable and understanding account.[11]

There were others, who may not have received their initial urge to science in Denison but whom we are proud to think of as distinguished alumni. One of these was George Shepardson, 1885, Professor of Electrical Engineering in the University of Minnesota. George Dorsey, 1888, was another. A classical student here, he may not have come under Professor Herrick's influence. But in his graduate studies at Harvard he switched to science altogether and went on to become famous in Anthropology and Ethnology. His book: *Why We Behave Like Human Beings*, was immensely popular, was a best seller. He became Curator of the Field Museum in Chicago, for which he had collected many Indian relics gathered in the Southwest of the United States and in South America.

His brother Herbert, who made a short visit to Denison last Commencement to meet with his class for their fiftieth anniversary, is famous in the realm of Physics. He invented the sound detector which was used effectively in the First World War by our Navy to spot the presence of enemy submarines. He has invented other devices, as the fathometer for measuring the depth of the ocean, and instruments for the improvement of the telephone and radio.

William E. Castle, 1889, was a thorough classical student in Denison and began his career as a teacher of Latin. But on going to Harvard for advanced study he chose science, specializing in Zoology. After a few years of teaching in the University of Wisconsin and in Knox College, he returned to Harvard as instructor of Zoology and eventually as Professor. His research has been mainly in the line of Genetics, in which he has made notable contributions.

We are proud also of Douglas Johnson, who won national and international fame as a geologist and geographer. He was a Denison student for two years until forced to seek a warmer climate for the recovery of his health. He went to Albuquerque to the University of New Mexico, and became assistant to Professor Herrick and a close companion. He accompanied Professor Herrick on his field trips which they made in a wagon drawn by a team of ponies. Sometimes they were overtaken by storms in the mountains and were forced to spend the night under a tent. It was rude and dangerous experience even for well men. After restoration of his health Douglas Johnson returned to the East, took his Ph.D. degree at Columbia in 1903, taught in the Massachusetts Institute of Technol-

[11] Charles Judson Herrick; *Clarence Luther Herrick, Pioneer Naturalist, Teacher and Psychobiologist*. Transactions of the American Philosophical Society, New Series, Vol. 45, Part I, 1955.

ogy and Harvard and finally in Columbia. Honors multiplied. He was President Wilson's confidential adviser in matters of geography and national boundaries at the Paris Peace Conference. He lectured in several European universities. The list of his degrees and honors takes up a half-column in *Who's Who in America.*[12]

Paul S. McKibben, '06, son of Professor George F. McKibben, studied under Professor C. Judson Herrick at Denison and at the University of Chicago. He gained recognition as an anatomist. He became professor of Anatomy in Western University at London, Ontario, in 1913 and Dean of the Medical School in 1917. He served as an officer in the Medical Corps of the U. S. Army in 1918. For a short period he taught Anatomy in the University of Michigan and was then called, in 1928, to be Dean of the Medical School of the University of Southern California. He spent the remainder of his life in that position until his death in 1941. Denison conferred on him the degree of D.Sc. in 1936.

Another companion of Professor Herrick in New Mexico was George E. Coghill. In his college course at Brown he had studied Psychology and Philosophy, and his inquiring mind reached out to penetrate more deeply into the mysteries of the mental processes. He resolved to study science as an approach to psychology on the physical side. A chance meeting with Professor C. L. Herrick brought him under the influence of this inspiring teacher. The study of Biology and Zoology was the foundation for his investigation of the relation of the mind with the body. As Professor C. Judson Herrick was pursuing a similar problem, the two men were brought into fellowship and became intimate friends and co-workers. It is not surprising that Professor Coghill was chosen as Professor C. J. Herrick's successor in Denison. He had his doctorate at Brown and several years of teaching science in the west, before coming here. After the fire in the Science Hall the department of Zoology was moved back to its former rooms in East Talbot, where Dr. Coghill had his laboratories and class-room. He kept at one time some opossums in cages in the basement for use in experimentation. Someone played a mean trick on him one night by freeing these animals. The Professor made no complaint, although it thwarted his plan of study for the time being. He was introspective and naturally somewhat aloof from other people. But he was a thorough scholar and uncompromising in what he considered just and right. "What I do," he wrote to Dr. C. J. Herrick, "I propose to do well and as nearly in line with my ideals as possible."

He spent six productive years here, 1907–1913. Besides his heavy load of teaching he added voluntary courses, one of them a lecture series in Eugenics. His wife attended this course as chaperon to the young women.[13]

If I have not wearied you already by this dry recital of names, I should like to pay tribute to some other men whom I knew personally and esteemed. I am thinking in this regard of some whom Professor Cole started on the road to excel-

[12] Frank J. and Anna Z. Wright: *Memorial to Douglas Johnson*, Proceedings Volume of the Geographical Society of America, May, 1945.

[13] For a biography of Professor Coghill, see C. Judson Herrick: *George Ellett Coghill*, University of Chicago Press, 1949.

lence in the domain of Physics and Chemistry. First in this group was J. Ernest Woodland, 1891, a teacher of Chemistry who founded the Woodland Memorial Prize. I remember a popular lecture he gave in Granville on the subject of Liquid Air, with experiments with that amazing product. In the course of his experiments he poured liquid air, that appeared like steam, from a container; and then he boiled a kettle of it on a block of ice.

Another chemist was Elmer Jones, 1903, professor of Chemistry in Adrian College for many years. His gratitude to Denison motivated his donation, at first anonymous, of funds to establish the Denison University Research Foundation.

Better known is Edward A. Deeds, 1897, who was the electrician of Barney Science Hall in his student days. He became well-known as President of the National Cash Register plant in Dayton, Ohio. With Mr. Kettering he founded the Dayton Engineering Co. for the manufacture of Delco batteries and other products. His name is perpetuated in Deeds Field and other generous benefactions to the College.

Clark Wells Chamberlain, 1894, who took Professor Cole's place as head of the department of Physics and Chemistry in 1901 and later was called to the presidency of the College, has a high place in Denison's history. He was famous as a physicist and also as college administrator. He devised the compound interferometer, an instrument for the exact measurement of infinitesimal distances by the interference of rays of light. He was fond of exhibiting this instrument in the Denison laboratory and we marvelled at the indication of a feather's weight or the impact of a breath of air on this device. An improved model of this apparatus is treasured among Professor Leon Smith's laboratory collection. The board of Trustees called Professor Chamberlain from Vassar College back to Denison in 1913 to preside over the College. His administration, which included the trying period of the First World War, was eminently successful in material and scholastic expansion. His merits as professor and president have been treated on a former occasion and I need not speak of them at greater length here.[14]

William E. Wickenden, 1904, attained distinction as a teacher of Electrical Engineering at the Massachusetts Institute of Technology and elsewhere and as director of investigation for the Society for Promotion of Engineering Education. He became President of the Case School of Science (Case Institute of Technology) where his work was highly appreciated and garnered well-deserved laurels of praise.

Daniel Dye, 1907, gave himself to missionary service as Professor of Physics in the Union University at Chengtu, West China, where he made a rich contribution to education in that country.

Paul Orcutt, 1905, and his brother Guy, 1907, great-grandsons of Deacon Shepardson who was one of the founders of the Granville Literary and Theological Institution, rose to executive positions in industry as electrical engineers.

William E. Forsythe, 1907, is a well-known physicist and has been director of research in the Lamp Division of the General Electric Company in Cleveland.

[14] See the addresses given by Mr. Herbert Shorney, President of the Denison Board of Trustees, Dr. Albert Davison and the present writer at the Dedication of the Portrait of President Chamberlain, March 11, 1949.

Clarence Coons, '09, stepped from the superintendency of the Granville public schools into the Physics department, first as instructor and later as Professor, succeeding Professor E. E. Lawton in 1913. Added to his teaching were the responsibilities as Treasurer and then as Business Manager of the College. He was prominent in civic affairs, as chairman of the Licking County Draft Board in the First World War and as Mayor of Granville.

Albert Davison, 1910, deserves separate treatment for his varied accomplishments as teacher, Director of the Owens-Corning Laboratory, and Trustee of Denison.

Charles Henderson, 1914, was instructor in Physics here until called to Syracuse University.

Botany was organized as a separate department in 1904, a year after Malcolm E. Stickney came as instructor in science. He was from Maine and had received his collegiate training in Bates College and advanced courses in Harvard, to which he added a year of study in the University of Wisconsin, 1907–08. Possessing some personal traits indicating his New England origin, he fitted well into this mid-western community. His class-rooms and laboratories occupied the first floor, East Hall of Talbot on both sides of the corridor. In addition to regular courses in Botany he offered sometimes a voluntary course in Ornithology. He led his students on sunrise excursions to the woods to observe the morning habits of the birds and in the evening to listen to their lullabies. But his best display was in his own garden at his home on Burg Street, where he practiced on a large scale what he taught in the class-room. He and his talented wife, Edith Bell Stickney, developed flower gardens and landscapes that excited the admiration of hundreds of visitors and were the inspiration of garden clubs and individual growers. On February 22, 1932, bi-centennial of Washington's birth, the double row of elm trees along "the Drag" which were planted under Professor Stickney's supervision was dedicated to the presidents of Denison and he officially named the avenue Presidents Drive.

He had a jovial disposition and his hearty laugh was contagious. Even in his final illness he did not lose his cheerful humor. He had a clear tenor voice which was usually heard in the Engwerson chorus and in the church choir. A popular song which he was often importuned to render to our delight was Kipling's "On the Road to Mandalay". The Stickneys left a pleasant memory in our College and town.

After an interval of four years following Professor Cole's resignation Arthur Marion Brumback was invited to head the department of Chemistry, 1905. The Brumback family is a tradition in Denison. Arthur's father was a student here in Civil War times and left college to enlist in the Union Army. Several uncles and aunts had come to the Granville institutions from their home in what is at present the Dawes Arboretum south of Newark, Ohio. The family of his wife, Clara Tuttle Brumback, has also a long record in Granville, dating from the Civil War and even earlier to the founding of our College and represented in the rolls of the alumni down to the present year.

Arthur came from Boise, Idaho, whither his family had moved. After graduating from Denison in 1892 he taught in public schools, took graduate work in the

University of California and was called to teach in McMinnville College (now Linfield College), Oregon, first as professor and then as president. With this background he was well qualified for the work in Chemistry here. The laboratories and class-rooms were transferred from Barney Science after the fire in 1905 to the basement of Doane Administration Building, which served for the department until the erection of Chemistry Cottage under Professor Ebaugh's direction. As the location in the basement of a building where hundreds of students gathered periodically for convocation in the upper hall was a fire hazard, a sentinel was stationed below to give warning in an emergency. But nothing worse than disagreeable odors from the lower regions ever bothered the people above. Professor Brumback worked arduously for the upbuilding of his department, to which students came in such large numbers that an assistant-professor was soon needed. Miss Lilybelle Sefton was appointed to this position. She was a unique, gifted personality and an inspiring teacher.

In the midst of his productive labors and in the prime of life Professor Brumback was taken by death in the summer of 1916.

His death was keenly felt in college, church and community, where he had gained an enviable place by his dependable character. It was a personal bereavement to me, who had known him since college days when we were fraternity brothers. His loss left a wide gap in the Faculty which was ably filled by the coming, in 1918, of Professor William Clarence Ebaugh. It is beyond the scope of this paper to treat of his versatile and competent talents which are familiar to many of you.

When Swasey Observatory was erected in 1909, Dr. Paul Biefeld was chosen to organize the new department of Astronomy. He was a graduate of the University of Wisconsin and earned his doctor's degree in the University of Zurich, Switzerland. After a professorship at a technical school in Germany he came to Buchtel College (now the University of Akron, Ohio), as professor of Physics and Astronomy. Presumably on the recommendation of Mr. Swasey he was called from Buchtel to Denison. He was worthy of the confidence placed in him by the Board of Trustees and responded ably to the trust of teaching and using the telescope and delicate instruments of the Observatory. He spent many hours on cold nights scanning the heavens and making scientific observations. He was glad to welcome visitors to the Observatory and to display the apparatus. He obligingly assisted in such other departments as German and Mathematics. He was with the Yerkes eclipse expedition to Denver in 1918 and again to Catalina Island in 1923.

From the beginning of scientific study at Denison Geology has played a leading role. The work has been directed by a series of capable instructors who have gained national distinction. After Professor Tight came Dr. Thomas L. Watson, graduate of the Virginia Agricultural and Mechanical College with his doctorate from Cornell. He impressed us as a thorough scholar endowed with the courtesy which we associate with the people of the Old Dominion. Several of his papers published in the *Journal of the Scientific Laboratories of Denison* show his interest in the geological formations of Georgia. He was a competent scientist but seemingly did not feel quite at home in this environment and was lured back to his native state and eventually to a professorship in the University of Virginia.

Then came another scholar from Cornell University, Dr. Frank Carney, who already had a rich experience in teaching and research. His professorship of Geology at Denison was marked with high distinction. He was called several times for scientific work outside of Granville and wrote many reports and special articles. He was responsible for acquiring the C. K. Gilbert collection of books and geological specimens for the College. He inclined to the area of applied Geology, such as mining and the study of topography as related to the location of roads and colonization. He wrote a series of monographs on the Geography of Ohio, treating of glaciation and its effects on the course of rivers, the deposits and soil. The Geologic Development of Ohio and the Geographic Conditions in the Early History of the Ohio Country are parts of the general subject.[15] Another report is on the Economic Mineral Products of Ohio.[16] These articles are important chapters of the history of the state. He inspired a large group of students who are too numerous to name in this survey. Chief among them, perhaps, are Kirtley Mather, 1909, Harvard professor; George Cressey, 1919, world traveller and Professor of Geography and Geology of Syracuse University; Carey Croneis, university professor and college president; and Raymond Moore, 1913, professor in the University of Kansas.

One brief paragraph in closing:

It has been intimated that the curriculum will be reviewed and the courses evaluated by the Faculty during this year. It is right, undoubtedly, that the courses should be scrutinized and improvements made when necessary, for new conditions require changes. But no course will be absolutely poor or bad, if conducted by such professors as I have portrayed. Denison will continue to flourish so long as we have men and women of their character and caliber to handle the instruction.

[15] Bulletin of the Scientific Laboratories of Denison University, Vol. XVI, 1911.
[16] Bulletin (as above), Vol. XVI, 1910.

A HISTORY OF FLORISTICS IN THE DOUGLAS LAKE REGION (EMMET AND CHEBOYGAN COUNTIES), MICHIGAN, WITH AN ACCOUNT OF REJECTED RECORDS[1]

EDWARD G. VOSS[2]

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INTRODUCTION

The literature of floristic botany abounds in papers reporting one or more species as new to the previously known flora of a particular region. The total number of published records for a given locality may thus accumulate to a considerable size through a period of years and with the contributions of many workers whose taxonomic philosophy and seriousness of interest may vary considerably. However, when an up-to-date treatment of the flora of a region is published, seldom is there a thorough effort to account for all previously published records which, in the light of modern standards, cannot for one reason or another be accepted. The list of 707 "Excluded Species" occupying 98 pages of Deam's *Flora of Indiana* is perhaps the most notable attempt to dispose of spurious records in an adequate manner.

If one does not prepare such a list, future workers may continue to attribute to the local flora species the records for which have been been discredited.[3]

[1] Manuscript received June, 1956. Contribution from the Biological Station of the University of Michigan. Much of the material in the present paper was included as introductory information or appendix in a thesis presented to the Horace H. Rackham School of Graduate Studies of the University of Michigan in partial fulfillment of the requirements for the degree of Doctor of Philosophy, June 1954.

[2] Class of 1950, Denison University. Denison University Research Foundation Scholar 1949–51. Present address: Michigan Flora Project, University Herbarium, Museums Annex, University of Michigan, Ann Arbor, Mich.

[3] They may anyway! *Cf.* Hermann (1951, p. 483) on some *Carex* records in Gray's *Manual*. Or old published records may again be revived to "supplement" a modern flora. *Cf.* the interchange between Fernald and Jones in *Rhodora* and *Amer. Midl. Nat.* in 1945.

More important reasons for presenting such a list, however, are the assistance it may be in interpreting older floristic and ecological work when restudies are made of an area, the help it may provide to those outside the area who are compiling distributional data for certain species, and the encouragement it may give to the search for particular plants in the area once it is made clear that previous records for them are unreliable.

The University of Michigan Biological Station was established in 1909 on the shores of Douglas Lake, in Cheboygan County. Since that time, the two counties, Emmet and Cheboygan, which share the northern tip of the Lower Peninsula of Michigan, have become one of the regions best known biologically in the country. In the early years, field work was largely confined to the immediate vicinity of the Station, but as transportation methods improved, it became convenient to consider the two counties in their entirety as the "Douglas Lake region." (Political boundaries provide precise, even if arbitrary, limits to an area.) In 1925, Gates and Ehlers published their annotated list of the higher plants of the region; this was supplemented in 1928, 1931, and 1948. It remains the only list of comparable thoroughness for northern Michigan, and is widely known and quoted as authoritative for that region—in a state for which recent floristic lists are unfortunately scarce.

It may be some time before the completion of a new list for the "Douglas Lake region" which can take its place with the excellent ones recently published for Kalamazoo County, Michigan (Hanes & Hanes, 1947), and Cook County, Minnesota (Butters & Abbe in *Rhodora* 55. 1953). Since so few such lists are available for the Great Lakes area, it seems well to present, in the meantime, the emendations thus far found to be necessary to bring the Gates and Ehlers list to date. A companion paper (Voss, 1957) to the present one reports the additions to the regional flora; the subtractions are presented herewith, following an account of botanical history which is given by way of background. Both papers are based on an effort to evaluate all previously published reports for the region,[4] including the Gates and Ehlers list and its supplements (which, with few exceptions, did *not* take into account any other published literature nor even the herbarium material available elsewhere in the region). In the introduction to their third supplement, Gates and Ehlers stated (1948, p. 27) that "This list, covering the first thirty years of systematic botanical work in the two counties mentioned, brings to a close our joint reports on the flora of the Douglas Lake region." They referred, of course, to *their* first thirty years; for specimens were being collected in the region for 50 years before the Biological Station was founded.

[4] Citations of specimens in monographs and revisions, as well as references in works of a more local floristic nature, have been considered, although it is of interest to note that the former source definitely added only one species (*Scrophularia marilandica*) to the list. A geographic analysis of Dale Hagenah's unpublished bibliography of Michigan botany, at the Cranbrook Institute of Science, has been of special help in making the search of literature more complete. In the historical account, text or footnotes at relevant points call attention to the specific efforts made (*e.g.*, herbaria consulted) to locate the basis of published records. *Cf.* also footnote 46.

FIG. 1. Emmet County, Michigan. Boundaries of political townships are shown, with their names indicated in capital letters. Enough of these correspond exactly with survey townships (*e.g.*, Maple River Tp. = T. 36 N., R. 4 W.) that the lines of the latter may be easily understood at six mile intervals where not actually drawn.

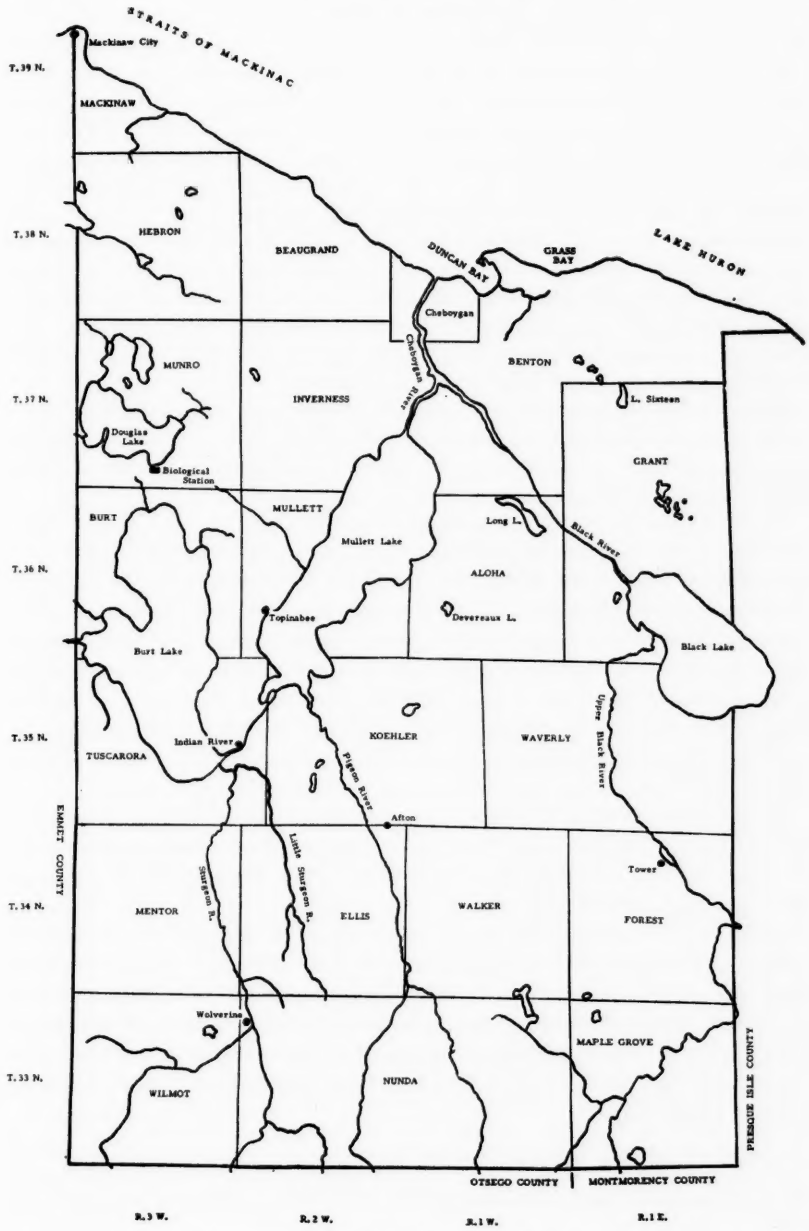

FIG. 2. Cheboygan County, Michigan. See explanation of Fig. 1.

It is the period prior to the Biological Station which is emphasized in the historical notes which follow. They do not purport to give a complete account of collecting in the area, but only to summarize some of the more interesting highlights and to bring together references to sources. The space devoted to a given worker depends not only on his importance to the subject at hand, but also on whether information is readily available elsewhere, for it has been thought that a contribution will be made by discussing at greater length those whose botanical activities are less well known. Special attention has been paid to the 50 years (1810–1860) in which the first observations were being made in the region by men with a professional interest in science. The historical review here presented will, I hope, be a useful general contribution to the history of biology in Michigan, rather than an account of purely local interest. Therefore, the biographical approach is emphasized and some matter included which, indeed, may be more or less extraneous to a strict limitation of the subject.

Many of the localities in Emmet and Cheboygan counties are familiar names to the people of Michigan and neighboring states, for whom this northern region is a popular resort area. A summary of major geographical features will be helpful before referring to places visited by early collectors.[5]

Crooked Lake, in southern Emmet County, discharges via the Crooked River into Burt Lake, in Cheboygan County. The Indian River connects Burt Lake with Mullett Lake, from which the Cheboygan River flows to Lake Huron at Cheboygan. Also in Cheboygan County is more than half the area of Black Lake, from which the Black River flows to the Cheboygan River. Douglas Lake, on which the Biological Station is located, lies north of Burt Lake. Mackinaw City, at the northern tip of the Lower Peninsula, has most of its area in Emmet County and most of its population in Cheboygan County. Cheboygan is the county seat, and other communities in the county include Topinabee, Indian River, Wolverine, Afton, and Tower.

On the shores of Little Traverse Bay, a portion of Lake Michigan in southern Emmet County, are the county seat of Petoskey (on Bear Creek) and a number of resort centers, including Bay View, Menonaqua, Roaring Brook, Ramona, Wequetonsing, and Harbor Springs. The villages of Carp Lake, Levering, Pellston, Alanson, Oden, and Conway are inland in the county; while Cross Village and Good Hart are communities on Lake Michigan. Wilderness State Park, one of the largest state parks in Michigan, lies southwest of Mackinaw City in northern Emmet County, occupying a peninsula (terminating in Waugoshance [or Temperance] Point) between Cecil Bay on the north and Sturgeon Bay on the south. Walloon Lake lies on the border between Emmet County and Charlevoix County to the south.

[5] See also figures 1 & 2. An excellent and detailed map of each county may be obtained from the Department of Conservation, Lansing, Michigan. Gates (1926, pp. 172–173) includes a map which shows local names for features in the immediate vicinity of Douglas Lake.

ACKNOWLEDGMENTS

In the course of this work I have become indebted to the various specialists who have determined material for me; their names appear with the accounts of the species involved.

During their summers at Douglas Lake, Dr. Rogers McVaugh, Dr. Carroll E. Wood, Jr., and, especially, Dr. Lloyd H. Shinners have given portions of the Biological Station herbarium the benefit of their critical examination. I have had the privilege of holding summer assistantships in systematic botany under all three. Dr. McVaugh has been a particularly helpful and patient guide through many matters of botanical taxonomy, nomenclature, and history during my studies in Ann Arbor. Dr. Warren H. Wagner, Jr., has been of special assistance with the Pteridophytes, and N. W. Katz has clarified several records of Gramineae. Dale J. Hagenah's extensive familiarity with the literature on the Michigan flora has been an extremely valuable resource made generously available. Many others, too numerous to mention, have been helpful in supplying information in correspondence or conversation; acknowledgments are freely made at appropriate specific places in the accounts of history and rejected records. The manuscript of the present paper has benefited at many points from critical reading and suggestions by Wagner, McVaugh, and Hagenah.

Those in charge of the herbaria at Albion College, Cranbrook Institute of Science, Michigan State University, and Oberlin College have made possible the study of collections under their care; and of course the ready availability of the resources of the University of Michigan Herbarium and the herbarium of the Biological Station has been invaluable.

My first field trip with Dr. Frank C. Gates was in July of 1948, when we hiked together with plant press and vasculum over several miles of dunes and shorelines in northern Emmet County. In the succeeding years, he was ever helpful and encouraging in many ways as I continued to work on the flora with which he had so long been associated during his many summers at the Biological Station. With his sudden death in 1955, the first major era of botanical work at Douglas Lake can truly be said to have closed.

A HISTORY OF FLORISTICS IN THE DOUGLAS LAKE REGION

1. Pioneer exploration at the Straits of Mackinac

The Straits of Mackinac, which separate Emmet and Cheboygan counties from the Upper Peninsula of Michigan, have long figured prominently in the history of the "Northwest." There is no record that Jean Nicolet, the first white man to pass through the Straits, collected plants on his way to Green Bay, Wisconsin, in 1634. But Thomas Nuttall (1786–1859),[6] headed for the same destination in 1810, appears to have been the first botanist to collect in the area. Until we can refer definitely to botanical collecting in Emmet and Cheboygan

[6] For a biographical sketch of Thomas Nuttall, see Pennell (1936). See also Graustein (1951).

counties, it will be of interest to consider the first work in the general region of the Straits.

On July 29, 1810, Nuttall wrote in his diary: "I left *Detroit* for *Michilimakinak* in a birch bark canoe . . ." (Graustein, 1951, p. 64). No further entries in his diary are dated until he arrived in Wisconsin early in September, so we may assume that it was during August that he botanized on Mackinac Island and vicinity, observing the plants reported from that region in his *Genera of North American Plants* (1818). Nuttall mentioned in the *Genera* several of the islands in the Straits of Mackinac, all of which today belong politically to Mackinac County (on the Upper Peninsula side of the Straits) rather than to Emmet or Cheboygan counties. We have no definite evidence that Nuttall set foot on the mainland of the Lower Peninsula in the Straits area, although such statements, for example, as "on the sandy shores of Lake Huron, near Michilimakinak" could easily refer to the beaches between Cheboygan and Mackinaw City.[7] Among the species for which Nuttall mentioned specific localities in the Straits region were three which were new to science, and which still today form a very characteristic portion of the flora:

Iris lacustris (*Gen., i:* 23): "On the gravelly shores of the calcareous islands of lake Huron, near Michilimakinak. (I have seen no perfect specimens, and therefore recommend the examination of this plant to future botanists.)" [One might inquire how Nuttall was able to describe the absence of a bearded crest in the flower of this species, which normally ceases blooming in the region in early June, if his canoe did not leave Detroit until July 29.]

Rubus parviflorus (*i:* 309): "On the island of Michilimackinak, Lake Huron."

Tanacetum huronense (*ii:* 141): "With *Artemisia canadensis* on the sandy shores of lake Huron, near Michilimakinak; abundant."

In addition, it is suggested by more generalized statements that the new species "*Melanthium glaucum*" [*Zigadenus glaucus*] (*i:* 232) and "*Orchis huronensis*" [*Habenaria hyperborea*] (*ii:* 189) were also seen at the upper end of Lake Huron, as well as elsewhere. Besides these new species, several others were specifically credited to localities in the Mackinac region:

"*Primula farinosa*" [*P. intercedens* Fern., or *P. mistassinica* Michx. *sens. lat.*] (*i:* 119): "On the calcareous gravelly shores of the islands of Lake Huron; around Michilimakinak, Bois Blanc, and St. Helena, in the outlet of Lake Michigan: abundant, *v. v. sine fl.*"

"*Ribes lacustris?*" (*i:* 140): "In dark and swampy forests amongst rocks, on the islands of lake Huron, near Michilimakinak."

"*Oxycoccus hispidulus*" [*Gaultheria hispidula*] (*i:* 251): "I have observed this plant north-westward as far as the outlet of lake Michigan . . ."

"*Artemisia annua?*" (*ii:* 144): "On the island of Michilimakinak in Lake Huron."

"*Tussilago palmata*" [*Petasites palmatus*] (*ii:* 166): "*v. v.* On the islands of Lake Huron, near Michilimakinak, in Fir woods, (*Abies* [*Tsuga*] *Canadensis*)."

"*Calypso americana*" [*C. bulbosa*] (*ii:* 195): "*v. v. sine fl.* on the island of St. Helena, near the outlet of Lake Michigan, in the shade of *Abies canadensis* attached to recent vegetable soil. (1811)."[8]

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[7] Pennell (Bartonia *19:* 53. 1938) corrected his earlier statement (1936, p. 9) that Nuttall probably included the Straits of Mackinac and the site of Mackinaw City in his general term "Michilimakinak."

[8] The date should be 1810. *Cf.* Pennell (1936, footnotes 17 & 20) for comments on Nuttall's apparently poor memory for dates.

"Taxus baccata?" (*ii:* 246): "on the islands of Lake Huron, near to Michilimakinak." [What Nuttall saw was undoubtedly *T. canadensis*, although he also lists this (from New York).]

A number of other species are mentioned for the shores or islands of Lakes Huron and Michigan, without definite localities. Such characteristic species as *Lathyrus japonicus* (as *"Pisum maritimum"*), *Cakile edentula* (as *"C. americana"*), and *Juniperus communis* were attributed to the shores. *Linnaea borealis* was said to be "abundant in the shady pine forests of Lake Huron," and *Polygala paucifolia* was seen "forming almost exclusive carpets of great extent in the Pine forests of Lake Huron." These are sufficient examples to indicate that although Nuttall may never have collected in the precise area considered as the "Douglas Lake region," he certainly deserves credit as the first botanist to have seen and recognized in his published work the distinctive features of the northern flora which to this day attract botanists to the Straits of Mackinac area.[9]

In 1820, the Governor of the Territory of Michigan, Lewis Cass, with the sanction and support of John C. Calhoun, Secretary of War, led an exploring expedition through the upper Great Lakes to the sources of the Mississippi River. Calhoun appointed Henry Rowe Schoolcraft geologist and mineralogist of the expedition, and he made extensive observations on natural history and Indian life. Also assigned to the expedition, as assistant scientist, was David B. Douglass (1790–1849),[10] professor of engineering at West Point, who acted as botanist. The party left Detroit on May 24, and returned on September 23. (Cass returned a few days earlier.) On June 6, they arrived at Mackinac Island, where they stayed until departing for Sault Ste. Marie on June 12. On the return trip, the night of September 8 was spent at "Old Mackinac" [the site of Mackinaw City].

The botanical results of the Cass Expedition were published by Torrey (1822). Twenty species—none of them new—are mentioned for the shores of Lake Huron and vicinity, although none are specifically credited to the Mackinac region. *Quercus alba* is said to have been "the first oak seen after leaving Michilimakinak"

[9] Before leaving Nuttall, we might also call attention to his description, as a new species, of *"Carduus undulatus* . . . On the calcareous islands of lake Huron, and on the plains of Upper Louisiana." (1818, ii: 130). In discussing this original description of *Cirsium undulatum*, Ownbey (*Rhodora 54:* 31. 1952) says: "Reference to its occurrence on the islands of Lake Huron is in error and is possibly resultant from confusion with some other species of *Cirsium* in literature." Rather than confusion from literature, what I suspect Nuttall probably had in mind from the Great Lakes shores was the endemic *Cirsium pitcheri*, not described until 1829 (see below). Nuttall does describe the flowers of his species as "reddish purple"; perhaps he associated vegetative material of the cream-flowered *C. pitcheri* with what he encountered in "Upper Louisiana" later on his trip and described as *Carduus undulatus*. Fortunately for the state of nomenclature, the type (a single basal leaf from "Missouri," at Philadelphia, figured by Ownbey) is *C. undulatum* as now understood. Even as recently as the 7th edition (1908) of Gray's *Manual*, the native range of *C. undulatum* continued to be given in manuals as including the islands of Lake Huron. (But *cf.* also Winchell, 1861, p. 275.)

[10] For a biographical sketch of David Bates Douglass, see Barnhart (1921, pp. 292–293). The Cass Expedition is briefly described by Rodgers (1942, pp. 63–66).

(Torrey, 1822, p. 68), and of *Iris lacustris*, Torrey says (p. 57): "Mr. Nuttall discovered this Iris in the same place where it was found by Capt. Douglass—on the gravelly shores of the Islands of Lake Huron." Dates are given for seven species—all before the expedition reached the Straits of Mackinac. (Schoolcraft's 1821 account is arranged in journal form, making it possible to determine the general locality from which species were collected, if the date is known.) It is quite probable that *Iris lacustris* and some of the other species for which dates are not given were found by Douglass on Mackinac Island. A description of the Island and an interesting early discussion of the history of the area are given by Schoolcraft (1821, pp. 110–124; 1855, pp. 59–71).

Cirsium pitcheri was described by Amos Eaton (*Man. Bot. N. A.*, ed. 5, p. 180. 1829), who credited Torrey with the epithet. (*Cf.* Merrill & Reeder in *Bartonia 24:* 55. 1947.) However, following the description are these statements: "First found by Dr. Zina Pitcher, on the great sand banks of Lake Superior. My specimen was collected by Dr. E. James, at Lake Huron, from which I made this description, not having seen Dr. Torrey's." Originally described in the genus *Cnicus*, the species was placed in *Cirsium* by Torrey and Gray (*Flora N. A., 2:* 456. 1843). A complete citation would thus be *Cirsium pitcheri* (Torr. *ex* Eaton) T. & G. As the publishing author is the important one in validating a name,[11] this may be shortened to *C. pitcheri* (Eaton) T. & G. Eaton clearly says that *he* is describing the species and that he did not see Torrey's material. It would be quite illogical to consider the type to be a specimen which Eaton admits he never saw, so the type locality of this handsome Great Lakes endemic must be considered as "Lake Huron," and the collector, E. James. (The epithet has in the past been almost universally attributed solely to Torrey, with the type locality given as Lake Superior, based on Pitcher's material.) In the course of trying to locate more precisely than "Lake Huron" the type locality of this species, I find that James was apparently the first collector after Nuttall and Douglass to botanize on Mackinac Island.

Dr. Edwin James (1797–1861)[12] studied medicine in Albany, New York, completing his training presumably early in 1820 or perhaps in 1819. (*Cf.* Pammel, 1907, p. 165.) It was customary for physicians of his day to be well trained in botany, and James was one whose interest in plants was especially strong (although not, as with men like Asa Gray and John Torrey, to the eventual exclusion of medicine). By order of Secretary of War Calhoun, dated February 28, 1820, Major Stephen H. Long was instructed to explore the country from the Missouri to the Rocky Mountains. Dr. James, having been recommended by

[11] Article 55 of the International Code of Botanical Nomenclature states: "For the indication of the name . . . to be accurate and complete . . . it is necessary to cite the author who first published the name concerned." Art. 58 (reduced to the status of a recommendation at Paris, 1954) reaffirms this principle when a name is published by one author but proposed by another, non-publishing one.

[12] For biographical sketches of Edwin James, see Pammel (1907–1908) and Kelly & Burrage (1920, pp. 606–607). See also Rodgers (1942, pp. 48–53). I am indebted to Dr. Rogers McVaugh for determining from the National Archives in Washington some exact dates and other information regarding James' activities in Michigan.

Torrey (and others), accompaned Long's Expedition as botanist and geologist, as well as surgeon under a civilian contract. On July 13 and 14, James led the first party to be successful in reaching what thereafter was called "James' Peak" on early maps, but which later became known as Pike's Peak. (The present James' Peak west of Denver is a different mountain.)

On his return from Long's Expedition, James applied for formal instatement as Assistant Surgeon, U. S. A. This was approved by the Senate in January, 1823. Until the fall of 1826, he was stationed at various posts in the upper Mississippi valley, but then was ordered to Fort Brady, at Sault Ste. Marie. Anticipating difficulty with ice conditions, he spent the winter in the East before attempting to reach Fort Brady, apparently going from Detroit in a lake vessel early in May. However, the former assistant surgeon at Fort Mackinac, Dr. Richard Satterlee, went on furlough at this time, and James took his place at Fort Mackinac beginning May 23, 1827. Satterlee's leave expired August 31, when James proceeded to his original destination, Fort Brady, where he stayed until the spring of 1832.[13] He was not again stationed in Michigan.

The type of *Cirsium pitcheri*, then, presumably was collected on Mackinac Island (or, conceivably, the mainland nearby, as suggested for Nuttall's collections) at some time during June, July, or August of 1827. Undoubtedly other plants were also collected. James had studied botany and geology with Torrey and with Eaton (Rodgers, 1942, p. 48), and continued to correspond with them. Rodgers (1942, p. 53) states that with Long's Expedition James "had reached the apex of his botanical career. He never did as much again for botany in a single expedition. To the last year of his life, however, he revered John Torrey, both as botanist and friend." Specimens from James which entered Torrey's herbarium would be at the New York Botanical Garden, where Torrey's collections now rest.[14] Those sent to Eaton, however, including *Cirsium pitcheri*, received less adequate care, for Eaton, who was primarily interested in teaching

[13] It is of interest to note that Dr. Zina Pitcher was also stationed at Fort Brady during this time.

The versatile Dr. James established a reputation as a careful observer of American Indian life and a reliable authority on Indian manners and customs. While stationed at Mackinac, he became a great friend of the Chippewas, into whose language he was the first to make a complete translation of the New Testament from the Greek. (This was published in Albany in 1833.) Aiding him with the language was John Tanner, who had been taken by the Indians from his home in Ohio at the age of five, and whose story of capture and adventures in the tribe which had adopted him as one of their own was published by James in 1830. (*Cf.* Pammel, 1907, p. 180.) James was a strong temperance advocate and an ardent abolitionist, and was active in both movements. During his translation of the New Testament he left the Presbyterian Church to become a Baptist, but in later years he "became dissatisfied with churches generally," in the words of his grand-daughter, for "infidelity to humanity and justice on the slavery question," and "disavowed allegiance to the government" (Pammel, 1907, pp. 171–172).

[14] Pennell (1935, pp. 120 & 610) refers to collections by James seen in the herbarium of the N. Y. Botanical Garden. The type of *Mimulus jamesii* T. & G. (from Iowa) is among these. Other plants, incidentally, named for James include the genus *Jamesia* T. & G. James himself described the Rocky Mountain white pine, *Pinus flexilis*, the columbine *Aquilegia caerulea* (the state flower of Colorado), and other species.

and popularizing botany, preserved at most only small scraps of specimens and apparently had no concept of the value of types. His herbarium, now at Yale University, has been described by Merrill and Reeder (*Rhodora 48:* 201–205. 1946. *Bartonia 24:* 41–45. 1947). No *Cirsium pitcheri* was found by Merrill, and Dr. Reeder has again very kindly searched the collection and assures me (*in litt.*, 1956) that there is no trace of this species.

Douglass Houghton (1809–1845),[15] the first state geologist of Michigan, worked in the northern part of the Lower Peninsula during the summer of 1838—the second year of the first survey. The botanical division of the survey, however, under the supervision of John Wright, with the assistance of George H. Bull, limited itself to the southernmost counties in 1837 and 1838, after which Wright resigned. Houghton's second annual report, for 1838, included a description of shore lines and hills from Mackinac Island to Little Traverse Bay (Fuller, 1928, pp. 181–182), and the following interesting observation (Fuller, p. 173):

> The Ottawa Indians, residing on Little Traverse bay, and who have somewhat extensive cultivated fields in the elevated limestone district of the interior, more particularly in the vicinity of one of the southwestern forks of the Cheboigan river, inform me that their crops of corn have not failed within their recollection to yield largely; and certainly I never saw finer corn than in some of their fields.

From Houghton's field notes, we learn that he entered Cheboygan County on June 20, 1838, having spent the previous night encamped on the shore east of Hammond Bay, Presque Isle County, where he "found the Calypso borealis growing here in abundance" (p. 113). The night of June 20, his encampment "was near the head of Bois Blanc island—Timber cedar, spruce, white pine, norway pine, white birch, tamarack, &c." (pp. 113–114). His sketch map shows this camp to have been on the Lake Huron shore of the point of land on the east side of Duncan Bay, near Cheboygan.

On June 21, he crossed to Bois Blanc Island and went on to Mackinac Island, where he spent the night. He worked June 22–25 on Mackinac Island, with some time spent on Round Island June 25. On June 26, St. Martins Islands were explored. On June 27, after waiting for a storm to subside, he crossed the Straits to "Old Mackina" [*sic*—no final consonant in notes or on his map], where he made the following notes (p. 118):

> An area of 25 to 30 acres destitute of large trees served to mark the original site of the town & numerous relics of the foundations of buildings, cellars, root houses, &c still remain, as also those portions of the cedar which were buried in the ground—On those portions of the

[15] For biographical data on Douglass Houghton, see Bradish (1889), Fuller (1928), and Rintala (1954). Bradish includes a summary of the geological reports, and Fuller includes the complete texts of them. Page references not otherwise identified in the present account of Houghton are to the first volume of his field notes, his own complete handwritten transcript of which consists of two large volumes now at the University of Michigan. A rather detailed history of the state geological survey has been given by Merrill (Bull. U. S. Nat. Mus. *109:* 158–239. 1920), condensed from a manuscript by Alexander Winchell.

grounds which were originally used for a garden the currant, gooseberry & a few apple trees were seen growing.[16]

The night of June 27 was spent on the bay [Cecil Bay] southwest of "Gros Cap" [apparently the headland west of Mackinaw City, including McGulpin Point], where he noted "Timber maple, beach [*sic*], white birch, with some spruce & cedar—Land good". On the 28th of June he continued around "Point Wabeshance" [Waugoshance] to the village of "La Crosse" [Cross Village]. Here he spent the night, noting that the Indian population was about 300, "altogether the most tidy appearing indians I have seen in the State." His sketch map (p. 119) showing the land from Mackinaw almost to Little Traverse Bay indicates, as does his text, the nature of the shore (sandy, stony, etc.), the kind of elevation close to the shore or seen inland, and the prominent forest trees. (This is characteristic of his maps and notes throughout.)

On June 29, Houghton proceeded to Middle Village (or, as he sometimes called it, "Middle Town") and L'Arbre Croche [at present site of Harbor Springs], where the missionary informed him (pp. 120–121) that:

the quality of the soil around them is first rate, that it is chiefly timbered with beach [*sic*] and maple & that the indians raise fine corn & potatoes upon such of the lands as they have placed under cultivation.

From L'Arbre Croche, Houghton went directly across Little Traverse Bay to the limestone region on the south shore, where he encamped for the night. On June 30 he continued westerly into what now is Charlevoix County, where he spent the night near the outlet of Lake Charlevoix.

The following season, in 1839, the biological work of the survey was much curtailed, and Houghton had as his sole sub-assistant George Bull.[17] However, this year actual collecting was done farther north in the state than previously. Houghton returned to the Straits area, and although he did not work in the region of Emmet or Cheboygan counties this time, we must outline his course, particularly as it relates to the type locality for *Solidago houghtonii*.

On July 26, 1839, Houghton left Detroit by steamboat for Mackinac [Island], where he arrived on July 28. On August 1, he left for Sault Ste. Marie in a rowboat, with George Bull and three day laborers. On August 2 they reached Drummond Island, and until August 14 worked around Drummond Island, the St. Mary's River, Sugar Island, St. Joseph Island, Les Cheneaux, etc. On August 14, he left Mackinac for Green Bay, accompanied by Bull and three oarsmen.

[16] The old fort at the present site of Mackinaw City was finally abandoned in 1781, when the last troops were transferred to the new site on Mackinac Island, where the fort was being completed with some materials brought across from the original buildings. The Lower Peninsula site, therefore, had been abandoned for over 50 years when Houghton visited it in 1838.

[17] After whom *Wulfenia* (or *Besseya*) *bullii* is named. It has not been possible to locate any information regarding Bull.

The night of August 14 was spent about 9 miles west of Pte. Aux Chênes, apparently on the bay just east of what now is shown on maps as Manitou Payment Point. On August 15, the party went along the shore until encamping for the night three miles west of "Menococien" [Millecoquins] River. His sketch map (p. 179) showing the Mackinac County shore from Pte. St. Ignace westward past Pt. Patterson shows the location of his camps, the principal trees, and other characteristic observations. *Solidago houghtonii* was described by Asa Gray (*Man.*, ed. 1, p. 211. 1848) from "North shore of L. Michigan; collected in the Michigan State Survey."[18] (Gray, who in 1837 had been appointed the first professor at the University of Michigan in Ann Arbor—though he never actually taught there, had received a set of the first survey collections.) An isotype in the herbarium of the University of Michigan is labeled "Aug. 15th 1839 North shore of Lake Michigan." From Houghton's field notes, we may assume that the type material, undoubtedly collected by George Bull, came from somewhere between about four miles southeast of the present site of the village of Epoufette and four miles west of the present village of Naubinway, in Mackinac County, for this is the region traversed by Houghton and Bull on August 15, 1839.

Nuttall, James, Houghton and Bull—all collected in Mackinac County on the north side of the Straits, where they were responsible for the type collections of several of the species most characteristic of the shores of the Great Lakes: *Tanacetum huronense*, *Cirsium pitcheri*, *Solidago houghtonii*. One additional Mackinac County collector of minor importance but considerable historical interest may be mentioned before we come to the first collecting definitely conducted in the "Douglas Lake region"—Emmet and Cheboygan counties.

Among some specimens recently received by the herbarium of the University of Michigan from the herbarium of the Academy of Natural Sciences, Philadelphia, is a sheet of *Populus balsamifera*, undated by appearing old, with the sole data: "Mackinaw, Dr. Drake." Daniel Drake (1785–1852)[19] was "the most eminent early nineteenth century physician of the Central West" (Horine, p. vi). A noted medical educator in Ohio and Kentucky, he founded the Medical College of Ohio, which opened in 1820, and in 1821 was instrumental in having the General Assembly of Ohio charter "the first hospital in the Mississippi Valley established for teaching purposes, staffed only by the professors of a medical school" (Horine, p. xx). One of the foremost citizens of Cincinnati, Drake entertained in his home the prominent visitors to that city, where in 1816 he made the acquaintance of Thomas Nuttall (Pennell, 1936, p. 23). On May 8, 1818, he began a successful series of public lectures on botany in Cincinnati.

[18] Dr. Grady L. Webster has kindly examined for me the type of *Solidago houghtonii* in the Gray Herbarium; the label reads "N. shore of L. Michigan. Mich. State coll." The name is correctly listed in the *Index Kewensis* as *S. houghtonii* T. & G. *ex* Gray. Gray, as publishing author, is the one to use in a shorter citation; his original description credited the name to "Torr. & Gray, ined." *Cf.* footnote 11.

[19] For biographical sketches of Daniel Drake, see Mansfield (1855), Horine (1948), and a short notice in Kelly & Burrage (1920, pp. 328–329). It was Drake who gave the name "Buckeye State" to Ohio, and his associations with the buckeye are described by Waller (1947).

After an often controversial period in Ohio, Drake joined the faculty of the Louisville Medical Institute in 1839, where he prepared his *magnum opus* on the "Principal Diseases of the Interior Valley of North America" (Cincinnati: 1850). In preparation for this work, he spent his summers from 1840 to 1850 traveling extensively from Mexico to Lake Superior and from the Alleghanies to the Rockies. Mansfield (1855, pp. 316–318) lists the contents of Volume 1 of "Principal Diseases," which covers topography, hydrography, and "climatic etiology." Chapter 12 is on the topography and hydrography of Lake Superior, Lake Michigan, Lake Huron, and the Straits of Mackinac. From the itinerary of Drake's travels (Mansfield, p. 321) we know that he spent the summer of 1842 in northern Ohio, Michigan, and the "Northern Lakes." The topographic maps which he prepared included one for Mackinac Island. On his return from the summer's travels of 1842, Drake published his article on "The Northern Lakes, a Summer Resort for Invalids of the South," which extolls the virtues of Mackinac Island. He also mentions L'Arbre Croche and the "*Petite Traverse*" as being near Mackinac, so perhaps his travels did include Emmet County, though there is no direct statement that he himself visited these places.[20] I have not learned the extent of his botanical collecting, which was presumably rather incidental, nor the ultimate fate of the bulk of his specimens.

The first survey of Michigan had terminated abruptly with Douglass Houghton's unfortunate drowning in Lake Superior in October of 1845. It was continued by legislative act of 1859, with the appointment of Alexander Winchell to the position of State Geologist. His "First Biennial Report" (1861) included a "Catalogue of Phaenogamous and Acrogenous Plants Found Growing Wild in the Lower Peninsula of Michigan and the Islands at the Head of Lake Huron," prepared by his younger brother, N. H. Winchell (1839–1914),[21] who had just entered the University of Michigan in 1858, and held the position of special botanical collector and assistant in 1860. During the latter part of the summer of 1860 the main party (but not including A. Winchell) journeyed from Mackinac Island along the Lake Michigan shore south to the south side of Grand Traverse Bay (A. Winchell, 1861, p. 27). A considerable amount of botanical work was evidently accomplished in Emmet County, for the county figures prominently as a locality in N. H. Winchell's list.

This is the first floristic list which includes observations that without question were made in the counties presently under consideration as the "Douglas Lake region," although the fate of any specimens collected is not known. (Winchell's collections came to the University in Ann Arbor, but none from 1860 have been encountered in the course of the present work.) Many species, such as *Tanacetum*

[20] Two quotations from Drake's 1842 paper will show something of the style and poetic quality of his writing. Of the whitefish, he says (pp. 421–422): "Its flesh, which is the cold and clear waters of the lake organized and imbued with life, is liable but to this objection, that he who tastes it once, will thenceforth be unable to relish that of any other fish." He continues (p. 422): "We must caution the gourmand, however, against the excessive use of trout . . . , which are said to produce drowsiness; for he who visits Mackinac, should sleep but little, lest some scene of interest may pass away unobserved."

[21] For a biographical sketch of Newton Horace Winchell, see Upham (1915).

huronense, were listed from the "sand dunes of Emmet Co." Species are reported from Bear Creek [Petoskey], Emmet Co., August 24; and a goldenrod is listed from Emmet Co., September 3; but dates are generally lacking. This list was N. H. Winchell's first published paper, although he later was a copious author on geology, into which field he followed the example of his brother.

During the summer of 1869, N. H. Winchell again visited the region. In December of that year he published an article on "The Cheboygan Region" in the *Michigan Farmer*[22] and in 1875 was finally published his report on the economic geology of Emmet, Cheboygan, and Presque Isle counties, based on his 1869 field work. This paper includes very brief mention of soils, forests, and agricultural potential of the land (1875, pp. 106–107).

Under the subject of pioneer botanical work in the region, reference might be made to the original land survey of the area. The two largest inland lakes in the region are named for deputy surveyors William A. Burt and John Mullett,[23] whose work in the region began in 1840. The northern portion of the Lower Peninsula was originally surveyed between 1840 and 1843, with some of the townships being resurveyed the next decade. This work was completed, in our two counties, in the summer of 1856.[24] Although no specimens were collected,[25] the land surveys are a source of data regarding forest composition. The original field notes of the surveyors mention (and, by their very nature, locate precisely) the species of trees used as witness and bearing trees at section corners each mile. In addition, trees were marked midway along each section line, and several "line" trees were frequently blazed. The survey notes, therefore, may be used to construct a generalized map of the original vegetation of a forested area. This method, which Kenoyer early used in southern Michigan (his first article on the subject is in *Papers Mich. Acad.* [for 1929] *11:* 211–217. 1930) and which Cain and his students have more recently applied in central and northern Michigan (*cf. Asa Gray Bull.*, N. S., *1:* 38. 1952), has not as yet been utilized in any published account of the vegetation of the Douglas Lake region,[26] although the

[22] Not seen by me; listed in his bibliography.

[23] It is for this reason that Mullett Lake is not correctly spelled "Mullet"; it was not named for a fish.

[24] See report of the Surveyor General of Michigan, p. 238, in House Exec. Doc. Vol. 1, part 1, 34th Congress, 3rd Session (1856–1857). [Doc. # 893]

[25] W. A. Burt did collect plants while surveying in the Upper Peninsula; these were determined by Dennis Cooley, and a list published in 1849: "Catalogue of Plants Collected by William A. Burt, Esq., on the Primitive Region South of Lake Superior, in 1846," pp. 876–882 in Senate Exec. Doc. No. 1, part 3, 31st Congress, 1st Session. [Doc. # 551]

[26] I am grateful to Paul D. Kilburn for a copy of his unpublished manuscript, "The Original Vegetation of the Douglas Lake, Michigan, Region," written in 1955 on the basis of the original surveys of the area surrounding the University of Michigan Biological Station—Burt and Munro Townships, Cheboygan Co., and a small portion of adjacent Emmet Co. Kilburn concludes that the floristic composition has remained unchanged during the past century (1855–1955), but that the changes are vegetational, lying in the size and relative abundance of the species. Hemlock, for instance, now a comparatively local species in the area, was the tree most frequently mentioned in the survey notes. Indian clearings (*e.g.*, on Colonial Point, Burt Lake) and early local attempts at logging were noted by the

original survey notes are available for consultation in Lansing, with copies at the courthouses in Petoskey and Cheboygan.

2. Miscellaneous collectors, 19th century

During the latter quarter of the 19th century, several botanists, professional and amateur, made small collections in the region—largely, it appears, on summer vacation trips.

The first man who followed N. H. Winchell's 1860 field work in the region seems to have been Rev. E. J. Hill (1833–1917),[27] the noted Illinois botanist. While teaching in Chicago, he spent many of his vacations on extended trips, some of them to northern Michigan. The summer of 1878 he botanized in Emmet and Cheboygan counties, being the first definitely to collect in the latter. Four short papers in his bibliography cite his collections of that summer: In December of 1878 he described a new variety of *Campanula rotundifolia* which grew "on sand hills at Indian River, near the outlet of Burnt [*sic*] lake . . ."; this note commenced with the phrase, "While collecting plants in the northern part of Michigan the past summer . . . ," and he also referred to specimens from the shore of Little Traverse Bay. In some notes published in 1881 he mentions three species from the Petoskey region (*Hippuris vulgaris*, *Cnicus pitcheri*, and *Goodyera menziesii*), and makes the interesting observation under "*Potamogeton pusillus* var. *major*" [*P. friesii*] that: "In 1878, while making the 'inland passage' between Cheboygan and Petoskey . . . a few plants were picked out of Crooked River . . ." To this day, the Crooked River is a favored spot for the collection of pondweeds by the classes in aquatic flowering plants at the Biological Station! In 1910 (*Fern Bull. 18:* 69), Hill mentioned having botanized for several days in Petoskey and vicinity in 1878, "some of the time along Bear Creek". In *Rhodora* (*8:* 187) for 1906, he also refers to having been at Petoskey in 1878. Hill's papers on plants of specific places elsewhere sometimes refer to species as also occurring at Petoskey, etc., but without dates of his observations in this region. Hitchcock and Chase (*Contr. U. S. Nat. Herb. 15:* 220. 1910) cited *Panicum tennesseense* from "Petoskey, *Hill* 162 in 1878," and this record was quoted by Farwell (*Rep. Mich. Acad. Sci. 20:* 165. 1919). Hill's herbarium was purchased by the University of Illinois following his death in 1917.

In the first work which attempted to supply an annotated list of the flora of the entire state, Wheeler and Smith's catalog of 1881, a considerable number of species are reported from Petoskey (or occasionally elsewhere in that vicinity) with an exclamation mark indicating that "we have collected the plant in the locality given, or have received it from others." These records are presumably based on collections made in 1879 by Charles F. Wheeler (1842–1910),[28] although

surveyors. Section summaries and descriptions of each township give information on topography, drainage, soils, and timber; and plat maps locate streams, lakes, and swampy areas. To the ecologist and historian, the original survey notes are a valuable resource.

[27] For a biographical sketch of Ellsworth Jerome Hill, see Chase (1917).

[28] For a biographical sketch of Charles Fay Wheeler, see Wight (1910). See also Rodgers (1952, pp. 10–30).

only one such reference is dated: *Salix glaucophylla* var. *brevifolia* is described from the notes of M. S. Bebb, based on a collection from "Sand dunes, Little Traverse Bay, Mich., July 30, '79. *C. F. Wheeler.*" Some specimens from that vicinity collected by Wheeler in 1879 are in herbaria; another published record for that season is of "*Bromus breviaristatus*"[29] in Beal and Wheeler (1892) and Beal (1905)—the two succeeding floras of the state. One of Michigan's most active collectors in the latter part of the previous century, Professor Wheeler (of the Agricultural College—now Michigan State University) again collected extensively in Emmet and Cheboygan counties in 1890. His records from that season first appeared in Beal and Wheeler's flora of 1892, and from specimens extant we know that he collected at a number of localities including Mackinaw City, Indian River, Black Lake, and Little Traverse Bay. Occasional specimens collected by Wheeler in other years in our region also exist. The Agricultural College had just purchased Wheeler's own herbarium before its destruction by fire when the Botanical Laboratory at East Lansing burned on March 23, 1890. Fortunately, many duplicates had been widely distributed, and some have since found their way back to East Lansing.

Several collectors of only a few specimens should perhaps be mentioned in this period. Even the early botanists from southern Michigan appear to have occasionally ventured north.

Dr. Daniel Clarke (1812–1884)[30] of Flint is frequently mentioned in the early state floras as a source of data from that region. His herbarium was purchased in 1891 by the Agricultural College, and includes at least one northern specimen of real interest. This is *Aster dumosus*; the pencilled label on the sheet reads "4973 Aster dumosus, L. Bay View Sept. 11, 1878 DC". One might suspect that since Clarke's field work was so generally limited to the Flint region this may be some "Bay View" other than the town adjacent to Petoskey, or that the specimen was received in exchange. However, the record was credited to Clarke for Petoskey in Wheeler and Smith (1881) and remained without correction in Beal and Wheeler (1892) and Beal (1905). As the first cottages were erected in the resort town of Bay View in 1877, it is not impossible that Clarke visited there in 1878.

Gilbert H. Hicks (1861–1898)[31] made collections of importance in the vicinities of Grayling, Owosso, and the Pictured Rocks. However, among other places he visited the Straits of Mackinac region, collecting on Mackinac Island in the summers of 1887, 1888, and 1889. The Michigan specimens from Hicks' collection were sent in exchange to the herbarium of the University of Michigan by Denison University in 1950 (*cf.* McVaugh, 1952). They include a few sheets from Mackinaw City (July 3) and Mullett Lake (July 4 & 5) collected in 1887, presumably while Hicks was returning from Mackinac Island to Grayling, where he was at the time station agent for the Michigan Central Railroad. It was not until 1890 that Hicks' love of botany won out, and he devoted himself completely

[29] See list of rejected records for a discussion of this report.

[30] For a biographical sketch of Daniel Clarke, see Beal (1902).

[31] For a biographical sketch of Gilbert Henry Hicks, see Smith (1899).

to the subject, graduating from Michigan State in 1892 and going on for further study at the University of Michigan. In January, 1894, he took a post with the U. S. Department of Agriculture in Washington, where he became First Assistant in Botany. After the death of Asa Gray in 1887, Hicks was active in founding the Gray Memorial Chapter of the Agassiz Association—later the Gray Memorial Botanical Association—of which he became the first president, and later editor of the original *Asa Gray Bulletin* from June of 1897 until his death.

Samuel H. Camp of Jackson is another whose work was primarily in the southern part of the state, but who made at least one trip northward. The most interesting specimen is *Lactuca hirsuta*, of which there is a sheet in the herbarium of Michigan State University, S. H. Camp No. 23, collected at Bay View July 15, 1894. Specimens of other species from this year are also at Michigan State and the University of Michigan. This was the same summer in which Camp spent a few days on Bois Blanc Island (Mackinac Co.), for which he published a short list (1895). Wheeler (1899, p. 82) reported "*Ranunculus purshii*" [*R. gmelinii*] from Topinabee on the authority of Camp.

Two specimens collected at Petoskey on September 4, 1886, by A. A. Crozier (1856–1899)[32] have been encountered; both are of species previously unreported from the region. These are *Scrophularia marilandica* and *Quercus macrocarpa*. The former is in the herbarium of South Dakota State College, and was cited by Pennell (1935, p. 288); Professor C. A. Taylor, who has kindly lent me the specimen, informs me (*in litt.*, 1956) that their herbarium also includes a specimen of *Diervilla lonicera* collected by Crozier at Petoskey on the same day. The *Quercus macrocarpa* is in the herbarium of Michigan State University. There are doubtless other specimens in existence, presumably distributed by the U. S. Department of Agriculture, whose labels they bear. (Crozier's specimens from elsewhere in Michigan, especially Grand Rapids, are occasional in collections.) Crozier, who was born in Ottawa County, Michigan, graduated from Michigan State in 1879 and received his M. A. from the University of Michigan in 1885. He was with the U. S. D. A. in 1886 and 1887, and at the Iowa Experiment Station 1888–1889. He then went to the Michigan Experiment Station, where he served as assistant agriculturist until his resignation due to failing health, on June 15, 1898. Old plat books for Emmet County show some land north of Little Traverse Bay belonging to "A. O. Crozier" and "A. Crozier"; perhaps he had relatives in the region. In 1885 he published a short note, "Ferns of Petoskey," listing 13 species.

Among the persons to whom Beal and Wheeler expressed indebtedness in their 1892 flora were "Prof. H. C. Beardslee, of the University School, Cleveland, O., and Prof. Chas. A. Kofoid, of Oberlin College, for a very complete list of the plants of Cheboygan County, Mich., observed by them during the summer of 1890, with full notes and many specimens." A similar statement was made in Beal's flora (1905), and both lists credit many species to Cheboygan County on the authority of Beardslee and Kofoid.

[32] For a biographical sketch of Arthur A. Crozier, see Pammel (1900).

Henry C. Beardslee, Jr. (1865–1948)[33] graduated from Western Reserve University in 1889 and received his A. M. from the same institution in 1892. From 1890 to 1901 he taught science in the University School in Cleveland, when he left to become one of the founders of the Asheville School for Boys, Asheville, North Carolina. He remained there as Senior Master until his retirement in 1919, and became known for his intensive study of the fungus flora of the region. Beardslee presented his herbarium in June of 1941 to Oberlin College, which he had attended for a year before going to Western Reserve and from which his wife (Anna Ford, whom he married in 1893) had graduated.

Charles A. Kofoid (1865–1947)[34] graduated from Oberlin College in 1890. He started collecting plants while a student at Oberlin, but his interests turned more to zoology and he became an assistant in that subject. Following his graduation, he spent one year teaching at Oberlin before he went on to Harvard, where he received his Ph. D. in 1894. During the year 1894–95 he was an instructor in vertebrate morphology at the University of Michigan. He then moved to Illinois, and in 1900 joined the faculty of the University of California, where for many years he was professor of zoology and chairman of the department, retiring in 1936. One of the foremost zoologists of the nation, Kofoid had a great share in establishing the present Scripps Institute of Oceanography. His herbarium was given many years ago to Oberlin; Prof. F. O. Grover informs me that he believes it was before he came to Oberlin in 1898. It is quite possible that, having become engrossed in zoology, Kofoid left his herbarium at Oberlin while he was teaching there in 1890–91.

Presumably it was on a vacation trip that these two young men collected in Cheboygan County in 1890. I am indebted to Professor Grover, and to Kees Lems, of the Oberlin Botany Department, for facilitating my search in their herbarium for all of the species which were attributed to Cheboygan County on the strength of Beardslee and Kofoid's list sent to Wheeler and Beal. It has not been possible to locate any copy of that list either at East Lansing or at Oberlin, but fortunately many of the specimens are to be found. They constitute the first collection of any size made in Cheboygan County. Most of the specimens came from the vicinity of Black Lake.[35]

Mary L. Freeman (1848–1922)[36] collected in northern Michigan, largely during

[33] For biographical sketches of Henry Curtis Beardslee, Jr., see Burlingham (1948) and Barnhart (1922).

[34] For biographical sketches of Charles Atwood Kofoid, see, *inter alia*, Kirby (1947) and Goldschmidt (1951).

[35] Duplicates of the collections of both men were fairly widely distributed. A Beardslee collection from Cheboygan Co., August 1890, was one of two collections besides the type (from Indiana) cited in the original description of *Juncus brachycephalus* f. *hexandrus* Martin (*Rhodora 40:* 460. 1938). Ames also cited Cheboygan Co. material by Beardslee & Kofoid ("The Genus Habenaria in North America," Orchidaceae Fasc. IV, pp. 132 & 151. 1910).

[36] I am indebted to Mrs. Freeman's daughter, Mrs. J. W. Bradshaw, for information about her mother and for a copy of the clipping quoted herein. Another daughter, Mrs. Reuben M. Strong, and her husband, of Chicago, have also done some collecting of plants in the region.

the last decade of the 19th century, most of her specimens coming from the vicinity of Harbor Springs. She was born in Ann Arbor, her father, William Stanton Curtis, being pastor of the Presbyterian Church. She graduated from Knox College, of which her father was then president, in 1867. In 1873, she married Judge Henry V. Freeman, who built a cottage on Harbor Point in 1891. Residents of Chicago since their marriage, the Freemans spent their summers on Little Traverse Bay from 1891 to 1922. Mrs. Freeman was especially interested in ferns and orchids, and built her herbarium with great enthusiasm. She was much concerned about conservation, and was active in organizing the short-lived Harbor Point Chapter of the Wild Flower Preservation Society of America. In the weekly Harbor Springs *Republican and Graphic* for July 18, 1917, this chapter published a plea, written by Mrs. Freeman, for protective action. "Northern Michigan has a rarely beautiful flora," she observed, "but even here the choicest wild flowers are rapidly diminishing." After decrying particularly the sale and export of lady's-slippers, she continued:

> Can we not make of the beautiful shores of Little Traverse Bay a sanctuary for the protection of wild life—both birds and flowers?
>
> If each lover of columbine would plant a root, our banks could soon be covered with these graceful nodding blossoms. With co-operation, the hare-bell, once so plentiful but now becoming rare, would increase on our sandy beaches.[37]
>
> With the passing of the forests we will lose the ferns from Northern Michigan. Ferns formerly grew abundantly in all our woods; if they were re-planted and protected we could enjoy here the fifty species native to this State.
>
> If every cottage owner would have a wild flower corner, if all would do their part to protect the wild flowers and ferns, we could make of the resorts around Little Traverse Bay a beautiful WILD FLOWER RESERVATION.

Mrs. Freeman's herbarium, numbering somewhat over 100 sheets, including some material from the Upper Peninsula, was given in 1949 to the herbarium of the University of Michigan by her daughter, Mrs. John W. Bradshaw, of Ann Arbor (*cf.* McVaugh, 1952).

The preceding notes on collectors are not intended to be exhaustive; a number of others who have collected a few specimens could also be named. Those to whom space has been given are ones of special historical interest or who collected especially uncommon species—particularly those being reported as "new" to the region in a companion paper.

3. Fallass and Swift

In the original Gates and Ehlers list of the higher plants of Emmet and Cheboygan counties, attention was called to "the detailed representation of the flora of Emmet County in the private herbarium of C. W. Fallass of Petoskey, Michigan." In their indications of county distribution, Gates and Ehlers marked (by "E*") any Emmet County records taken from a manuscript list by Fallass

[37] One is reminded of E. J. Hill's statement in 1878: "This abundance of flowers seems to characterize nearly all of my specimens of C[ampanula] rotundifolia gathered along the shores of Little and Grand Traverse bays."

and Charles H. Swift if the species in question had been found only in Cheboygan County by Biological Station workers. Almost never were any of the Fallass and Swift records quoted if the species were not already on the Station list for Cheboygan County; nor was Fallass' herbarium (in Petoskey) consulted when the lists were compiled for the "Douglas Lake region," even though the "region" had come to include all of the two counties. A full account of Fallass and his herbarium has already been published (Voss, 1955), so it will suffice here merely to place him and his chief collaborator in the appropriate historical position.

Charles W. Fallass (1854–1942), a native of Kent County, Michigan, built a summer cottage in Bay View in 1887, and started collecting plants in the vicinity that summer. In 1898 he moved permanently to Petoskey, where he became a leading businessman and citizen of that city. He built up a large personal herbarium of Emmet County plants, with some material from neighboring counties (as well as from more distant points). The herbarium, including probably several thousand specimens from the region presently under consideration, was given to Albion College (from which Fallass had graduated in 1873) after his death in 1942.

In much of his botanical work in northern Michigan, Fallass had the collaboration of Dr. Charles H. Swift (1881–), now Associate Professor Emeritus of Anatomy at the University of Chicago. Swift has been a summer resident of Bay View since 1899, and it was he who suggested to Fallass, whom he had met in 1903, that they should prepare a list of the local flora. An enthusiastic botanist by avocation, Swift did not make specimens for himself; almost all collections of his which have been preserved are in the Fallass herbarium. His suggestion of a list was eagerly received, and in the fall of 1918 Swift prepared a preliminary list and sent it to Fallass for additions. (This original copy with Fallass' additions is still in Dr. Swift's possession, and has generously been lent to me by him.) A copy of the combined list was then sent by Swift to Beal for inclusion in a future edition (which never materialized) of the "Michigan Flora." A second copy was apparently given to Fallass, for it is with the herbarium at Albion, and includes annual additions through 1934, entered in Fallass' hand. It is evidently this latter copy which was made available to Gates and Ehlers, including additions through 1922. A carbon copy of Dr. Gates' typed copy of the list was recently placed in the library of the Biological Station by Gates. (Another carbon copy, presumably given to Fallass, is with the herbarium at Albion.) Considering the times that it was copied and emended, it is not surprising that there are some minor differences between the original list and the copy now in the Station library.

4. Miscellaneous collectors, 20th century

In 1903, Samuel Monds Coulter wrote a doctoral thesis at Washington University on an ecological comparison of six typical swamp areas from northern Michigan to Arkansas (Coulter, 1904). The field work had been done during the previous three years. The first area discussed was a drained swamp along the Crooked River (Emmet Co.), with some supplementary observations "at the

outlet of Walloon Lake near Petoskey" [*i.e.*, Bear Creek]. Lists of species for both areas are given. A recent inquiry to the Missouri Botanical Garden reveals that no one there recalls seeing any specimens collected by Coulter and that, specifically, the species not otherwise reported from our region cannot be found; the alumni office at Washington University and the office of the Shaw School of Botany report no current record of Coulter. (Van Schaack, *in litt.*, 1956) Coulter's work, although brief, was apparently the first definite ecological study in the region.

It has been a main purpose of this historical account to emphasize botanical field work prior to the opening of the Biological Station on Douglas Lake in 1909. Before giving a summary of the chief events in the development of floristics at the Station, mention may be made of a few 20th century collectors who were not associated with the Station—whether as staff, students, or visitors. To mention every botanist who has taken a few specimens from the region since the founding of the Station would be to list a large share of the hundreds who have spent a few days to several sessions at Douglas Lake. W. H. Camp, Mrs. C. C. Deam, R. M. Harper, L. H. Harvey, Jr., F. J. Hermann, J. H. Schaffner,[38] J. R. Swallen —these are only a few of the collectors whose specimens from the region have been cited in published literature; they give some idea of the importance of the Biological Station area as a center for botanical study. (Similar statements can be made for the study of the lower plants.)

Among the botanists whose work in the region had absolutely no connection with the Station is the indefatigable Charles K. Dodge (1844–1918).[39] Dodge (1921, p. 15) mentions his visits to the region in 1912 and 1913 as part of a survey of the shore of Lake Huron from Bay County northward, sponsored by the Michigan Geological and Biological Survey. In addition, his herbarium (which was left to the University of Michigan on his death) includes material from 1914, as well as 1912 and 1913, in our region, where field work was evidently limited to the vicinities of Cheboygan and Mackinaw City.

It might be observed in passing that another notable Michigan collector, Oliver A. Farwell (1867–1944),[40] evidently never visited the Douglas Lake region. A stand of *Levisticum officinale* near the west end of Mullett Lake was noted by Farwell from the train window on his 1925 vacation trip (*Amer. Midl. Nat. 10:* 22. 1926), but this seems to have been the extent of his observations in our region. In fact, he botanized very little anywhere in the general area of the Straits of Mackinac, having spent but four hours on Mackinac Island on June 20, 1895.[41]

[38] It was after examination of herbarium material from Douglas Lake, followed by his own field work in the region, that Schaffner concluded that *Equisetum nelsonii* was a distinct species (*Amer. Fern J. 16:* 45–48. 1926).

[39] For a biographical sketch of Charles Keene Dodge, see Billington (1921).

[40] For a biographical sketch of Oliver Atkins Farwell, see McVaugh, Cain, & Hagenah (1953).

[41] *Cf. Asa Gray Bull. 4:* 52. 1896. He also cited *Carex deweyana* from Mackinac Island (*Rep. Mich. Acad. Sci. 20:* 169. 1919). Wheeler (1899, p. 86) cites two Antennarias from the Island on Farwell's authority. Evidently the four hours were well spent!

Fallass' herbarium and his knowledge of the local flora brought to him many visitors interested in the plants of the state. Among these, for example, were Branson A. Walpole and Harold D. Clayberg. Clayberg (1920, p. 28) mentions summering in the "Petoskey-Walloon Lake Region" for 12 years (presumably 1908–1919), and expresses appreciation to Fallass and Swift for their cooperation in his ecological study of the upland societies of that region. Walpole (1927, p. 307) mentions visiting Fallass' herbarium, and some specimens collected by Walpole at Bay View in the 1920's are in the Fallass herbarium and at the Cranbrook Institute of Science.[42]

*5. The University of Michigan Biological Station**

Even if the Biological Station had never been established, the flora of the two-county region would probably be among the better known in the state as a result of the collections already alluded to—even though previous work has been largely ignored by Station botanists.

During the first two sessions of the Station, in 1909 and 1910, listing of the local flora was begun by F. A. Loew; some specimens from this period are in the Station herbarium. In 1911, Frank C. Gates was located at the Biological Station while engaged as an agent of the Michigan Geological and Biological Survey. In 1913, Gates' list of the species found during the first three seasons accompanied his published report on the vegetation. The first set of Gates' 1911 collections is in the herbarium of Michigan State University; many duplicates are at the University of Michigan, where his field notebook of the season is on file. In 1912, Maud Robertson extended the knowledge of the flora while making a herbarium for the Station. At this time, H. A. Gleason took charge of the list of the flora. The list reverted to Gates when he came to the Station to teach in 1915, and starting in 1916 Gates and John H. Ehlers shared the responsibility for extending and recording the knowledge of the flora of the region. (*Cf.* Gates & Ehlers, 1925, 1928, 1931, & 1948.)

Dr. Gates has written that "in the early days there wasn't really a herbarium and what there was was piled into a box over the winter, which wasn't very conducive to leaving specimens with them." (*in litt.*, 1953). In 1911 and 1917 Gleason "collected and pressed no plants at all" himself (*in litt.*, 1956). So it is not surprising that some of the earlier records cannot be supported by specimens currently in herbaria.

The introduced flora of the vicinity of Douglas Lake was surveyed during the summer of 1914 by Gleason and McFarland (1914). These observations were continued and in part repeated in 1917 (Gleason, 1918) and again in 1928 (Coburn & Dean, 1930). These studies are of considerable interest in tracing the spread

[42] Several of the Crucifers reported from the region by Walpole, however, are to be found neither in Fallass' herbarium (where he claimed to have seen them) nor in his own herbarium (now at Cranbrook).

* A history of the Biological Station, with special reference to ornithology, has been published recently by Nelson (1956, pp. iv–xvi), who also gives a useful gazeteer (pp. 91–97) for the region. Many photographs and notes of great historical value from the first sessions were given to the Station in July of 1956 by Mrs. Maud Robertson Jacobs.

(or decrease) of many of the non-indigenous species. The fern flora of the region was early studied by McFarland (1916). In 1913 Gates published a broad account of the general ecology of the region, and in 1926 he summarized successional relationships in detail. More specialized studies have included those of Gleason (1925) on the beech-maple association, Gates (1930) on the aspen association, and Gates (1942) on bogs. The bibliographies in these papers and in Darlington (1945) list a large number of the ecological references pertaining to the area.

Dr. Ehlers' last summer at Douglas Lake before his retirement was in 1938; a few additional records by Dr. Gates from 1936 to 1945 were included in their third list of additions (1948) which, it stated, "brings to a close our joint reports on the flora of the Douglas Lake region." In the meantime, a great deal of field work has been accomplished in the two counties. Until his death in 1955, Dr. Gates continued to collect occasional specimens in the course of his ecological work. Those who have taught systematic botany at the Station have also made contributions to our knowledge of the flora. Among the larger collections in the latter category are those of Rogers McVaugh (1948 & 1949), Carroll E. Wood, Jr. (1950, 1951, & 1953), and L. H. Shinners (1952). E. U. Clover (1953 & 1954), W. H. Wagner, Jr. (1952 & 1955), and F. K. Sparrow (aquatics in several years) have likewise collected significant material in the summers they have taught at the Station. Almost complete sets of all of these collections have been incorporated into the Station herbarium with the exception of those of Shinners, which are at Southern Methodist University (duplicate sets distributed elsewhere).

In earlier years, several of Gates' ecology students contributed to the Station herbarium specimens collected in special studies, particularly of bog and weed floras, and new records were included by him in the lists. More recently, systematics students have specialized in particular groups in the region: *e.g.*, Richard Hauke, on *Equisetum*; Ruth Rosa, on ferns; M. Bedell, on *Potamogeton*; Gary Kikudome, on *Juncus*; and Agnes Kugel, on deciduous forest flora. Their specimens have greatly enriched the representation in the Station herbarium.

My own collecting in the region began in 1945, and has sought to emphasize portions of the two-county area not previously well known, as well as the spring seasons, when no collecting had been done by Station personnel. During 11 seasons, I have had field experience in the region with well over three-fourths of the species now on the accepted list, and have actually collected specimens of a little over 60% of the flora. Sets (in no case complete) of my collections are in the herbarium of the Biological Station, the herbarium of the University of Michigan, the herbarium of Southern Methodist University, and my own herbarium. After Gates and Ehlers brought to a close, as of 1945, their joint reports on the flora, no systematic effort at recording additions or corrections was made until I commenced, in 1951, the present task of evaluating *all* previous work in the region. The two counties have now been covered with considerable thoroughness, both geographically and seasonally, and while additional species will doubtless turn up each year, and some old misdeterminations be discovered, it seems well to organize the great mass of data which will bring the list again to date.

6. Types from the Region

An intensive effort to locate taxa for which the type locality lies in Emmet or Cheboygan counties has not been made, but the following entities constitute what is probably a fairly complete list. Following each name is the place of publication and an appropriate quotation regarding type locality and collection; the location of the type, if given in the description or otherwise inferred, is indicated.

Campanula rotundifolia var. *canescens* E. J. Hill
(*Amer. Nat. 12:* 817–818. 1878)
"Grows on sand hills at Indian river, near the outlet of Burnt [*sic*] lake, Sheboygan [*sic*] Co., Mich. [1878]"
TYPE presumably in Hill's herbarium, now at the University of Illinois.

Carex vulpinoidea var. *pycnocephala* Hermann
(*Rhodora 38:* 363–364. 1936)
"Sandy shore of Big Stone Bay, Lake Michigan, 3½ miles west of Cecil Bay, Emmet County, August 14, 1934, *F. J. Herman*, no. 6408"
TYPE cited as in herb. F. J. Hermann, now in Gray Herbarium (*fide* Hermann, *in litt.*, 1956).

Habenaria psycodes var. *ecalcarata* Bryan
(*Ann. Mo. Bot. Gard. 4:* 38. 1917)
"Near Bay View, Michigan, July, 1913, *Dr. Charles H. Swift*" [From Round Lake, *fide* Swift, personal communication.]
TYPE in herb. Mo. Bot. Gard. (No. 701166).

Habenaria psycodes var. *varians* Bryan
(*Ann. Mo. Bot. Gard. 4:* 37. 1917)
"Near Bay View, Michigan, July, 1913, *Dr. Charles H. Swift*" [From Round Lake, *fide* Swift, personal communication.]
TYPE in herb. Mo. Bot. Gard. (No. 710165).

Mimulus glabratus subsp. *michiganensis* Pennell
(*Mon. Acad. Nat. Sci. Phila. 1:* 119–120. 1935)
"Banks of Niger [*sic*, for "Nigger"] Creek near Topinabee, Cheyboygan [*sic*] County, Michigan, collected in flower July 13, 1925 by J. H. Ehlers 3240"
TYPE in herb. Univ. of Mich. ISOTYPE in herb. Univ. of Mich. Biol. Sta.

Rosa acicularis var. *rotunda* Erlanson
(*Papers Mich. Acad. Sci., Arts, & Letters* [for 1925] *5:* 84–85. 1926)
"Cheboygan County, North Fishtail Bay, Douglas Lake, 1924, *C. O. and E. W. Erlanson*, No. 628 (Bot. Gard., Univ. of Mich., No. 5892)"
TYPE in herb. Univ. of Mich.

Rosa michiganensis Erlanson
(*Rhodora 30:* 111–112. 1928)
"Sandy shore of Douglas Lake, Cheboygan Co., Aug. 20, 1924, *C. O. and E. W. Erlanson* no. 637, Bot. Gard. Univ. Mich. no. 5890"
TYPE in herb. Univ. of Mich. [North Fishtail Bay]

Rosa schuetteana Erlanson
(*Rhodora 30:* 112–113. 1928)
"Moist wooded shore of Douglas Lake, August 18, 1924, *C. O. & E. W. Erlanson* no. 629" (Bot. Gard. Univ. Mich. no. 5891)
TYPE in herb. Univ. of Mich. [near Pine Point]

Rubus peracer Bailey
(*Gent. Herb. 5:* 492–494. 1944)
"Cheboygan County, top of lower peninsula of Michigan, on bank of a stream, near University of Michigan Biological Station, *Bailey 788.*"
TYPE presumably in Bailey Hortorium.

Salix glaucophylla var. *brevifolia* Bebb in Wheeler & Smith
(*Cat. Phaen. & Vasc. Crypt. Pl. Mich.*, p. 72. 1881)
"Sand dunes, Little Traverse Bay, Mich., July 30, '79. *C. F. Wheeler.*"
TYPE in herb. Chicago Nat. Hist. Mus. (sheet no. 3459), *fide* Schneider in *J. Arn. Arb.* 1: 158. 1920.
Note: This name should be dated from Wheeler & Smith, to whom Bebb furnished a description which was placed by them in quotation marks. It was not published by Bebb himself until 1889, when he gave a description almost identical to the one he had furnished Wheeler & Smith. The name, incidentally, was spelled "*glaucaphylla*" when published by Bebb (*Rep. Dept. Nat. Hist. Northwestern Univ.* 1889: 23. 1889).

Salix interior var. *wheeleri* Rowlee
(*Bull. Torr. Bot. Club 27:* 253–254. 1900)
"Black Lake, Choboygan [*sic*] Co. (C. F. Wheeler, no. 3)."
Note: No type was designated by Rowlee, but he cited material from several states, of which the Michigan collection quoted above is the only one by Wheeler, after whom the variety was named, so it is reasonable to consider it the type.

Solidago jejunifolia Steele
(*Contr. U. S. Nat. Herb. 16:* 223–224. 1913)
"Collected on Indian River, Cheboygan County, Michigan, August 8, 1890, by C. F. Wheeler."
TYPE in U. S. Nat. Herb. (No. 619303).

VEGETATION AND MAN IN THE DOUGLAS LAKE REGION

In order to round out the history of floristics in Emmet and Cheboygan counties, a few words are appropriate regarding the inroads of civilization—or at least of man—on the vegetation.

The possible influence of Indians on the present flora is difficult to assess. A thorough discussion of the Indian as an ecological factor has recently been published (Day, 1953). It is pointed out that activities to be considered include clearings for villages, agriculture, and fuel; fire to improve traveling and visibility, and to control game and vermin; migrations and relocation of villages and agricultural plots. Day concludes (p. 343) "that an area which was wooded when first seen by white men was not necessarily primeval; that an area for which there is no record of cutting is not necessarily virgin; and that a knowledge of local archeology and history should be a part of the ecologist's equipment."

The Straits of Mackinac region, including the site of Old Fort Michilimackinac

at Mackinaw City and other historic locations in Emmet and Cheboygan counties, has long figured prominently in the history of Michigan. Jesuit missionaries were among the first white men to venture into this region of the upper Great Lakes. Fernald (*Rhodora 2:* 133–142. 1900) has called attention to the potential value of their extensive records as early sources of botanical information. Linehan (1918) has treated the early missions in Emmet County, where the one at the old L'Arbre Croche site [Middle Village][43] was established by Jesuit Fathers in the latter part of the 17th century. Before lumbering commenced, Indians, missionaries, explorers, traders, hunters, and trappers centered activities in the Straits area. A thorough study of the historical and archeological literature might be a fruitful ethnobotanical study, but is beyond the scope of the present work. Only a few highlights can be given here as general background to suggest some sources and to imply what factors may have been involved (but not necessarily *how*) in the recent floristic history of the region.

The united tribes of the Chippewas and Ottawas ceded to the United States the land from the Grand and Thunder Bay Rivers in the Lower Peninsula to the Chocolate and Escanaba Rivers in the Upper Peninsula, in a treaty of March 28, 1836, negotiated by Henry R. Schoolcraft. The land received by the United States amounted to almost 14 million acres, including, of course, the northern Lower Peninsula. It was noted in contemporary reports that maple sugar and corn were sold "in the Mackinac market" by the Ottawas of the region, especially from the villages on Little Traverse Bay. Of the Chippewas, it was said that "no part of their subsistence, within the *present* limits of Michigan, is derived from wild rice, a plant common at more northerly and westerly points."[44]

Indian trails in northern Michigan (*cf.* maps in Hinsdale, 1931) connected with those elsewhere on the continent, and it is not impossible that some species still survive which were originally brought in for cultivation or by accident.

[43] The "new" L'Arbre Croche mission site, visited by Houghton, was on Little Traverse Bay. In general, the L'Arbre Croche region refers to the entire shore from Harbor Springs as far as Cross Village. Blackbird (1887, pp. 46–47) disputes the existence of early missionary activity among the Ottawas, but *cf.* Wright (1917, pp. 156–158) for a more detailed chronology of missions.

[44] C. A. Harris, "Report of the Commissioner of Indian Affairs," Senate Public Doc. No. 1, 25th Congress, 2nd Session, p. 531; 1838. [Doc. # 314] For a summary of this treaty, see also Alpheus Felch in *Mich. Pioneer & Hist. Coll. 26:* 284–285 & map facing p. 275; 1896. Blackbird (1887, pp. 51–52 & 97–98) expresses the Indian dissatisfaction with the treaty.

Among the counties laid out by the State Legislature, as approved April 1, 1840, were Tonedagana, Cheboygan, and Wyandot. In 1843, the Legislature approved the change of name from Tonedagana to Emmet, in honor of the Irish patriot, Robert Emmet. For several years the counties were still administered from Mackinac County, which had been laid out and organized as Michilimackinac County by Lewis Cass, October 26, 1818, to include most of the area of Michigan. Early in 1853 Emmet and Cheboygan counties were officially organized with provision for their own government. At this time, Charlevoix County was included in Emmet, and Wyandot in Cheboygan; there was also some alteration of the division between Emmet and Cheboygan. Charlevoix County returned to a separate existence and was formally organized in 1869, and its boundary with Emmet County finally adjusted in 1895. (Sources: *Rep. Pioneer Soc. Mich.* 1. 1877. *Mich. Hist. 2:* 587–589. 1918.)

(Most of the L'Arbre Croche Indians regularly spent the winter farther south in Michigan.) Occasional Indian clearings were noted on lines of traverse in the notes of the government surveyors, largely near the lake shores. (Foster, 1942, p. 536. *Cf.* also previous discussions of the original land survey and of Douglass Houghton's notes, above.) Winchell (1861, pp. 286 & 315) reported that *Nicotiana rustica* (wild tobacco) and *Setaria italica* ("as Millet") were "cultivated by the Indians" in Emmet County. Hinsdale (1931, p. 20) reports that "corn was so extensively cultivated that the garrisons in later times at Fort Mackinac depended upon the Ottawas from L'Arbre Croche for this commodity." And Schoolcraft (1821, pp. 402–403) observed that the L'Arbre Croche Ottawas "are settled upon a very fertile tract of land, and raise corn, potatoes, pease, beans, cucumbers, and pumpkins, not only in sufficient quantity for their own subsistence, but they annually take a quantity of corn to the Michilimackinac market." The great importance of the maple sugar traded by these Indians at Michilimackinac has also been described by Schoolcraft (1855, p. 71).

Hinsdale (1931, p. 18) states that five Indian village sites have been identified in Cheboygan Co.: one at the mouth of the Cheboygan River, another upstream below the outlet of Mullett Lake, two on the west side of Burt Lake, and one on the south side of Douglas Lake. Sites have also been identified for three burying grounds and six mounds. Two trails from the south met at the mouth of the Cheboygan River, and united near the shore for the rest of the way to the Straits. One came from west of Black Lake along the Black River, and the other is tentatively mapped by Hinsdale (map 14) as following the sandy trail road which today runs southeast-northwest through R. 1 E., T. 37 N.

Hinsdale (pp. 19–20) enumerates Indian sites identified in Emmet County as nine villages, five burying grounds, and two mounds. A trail extended from Mackinaw along the bluff following the lake shore to Little Traverse Bay. Along this shore there was "a village every few miles, although the exact situation of some of them cannot be determined. . . . Before L'Arbre Croche, or the L'Arbre Croche district, was depopulated by smallpox, according to the story of Mackawdebenessy, or 'Blackbird,' a continuous village of some fifteen or sixteen miles long extended from what is now Cross Village to Seven Mile Point." "The reason that to-day we see no full-grown trees standing along the coast of Arbor Croche, a mile or more in width along the shore, is because the trees were entirely cleared away for this famous long village . . ." (Blackbird, 1887, p. 10).

The family of Ulysses P. Hedrick, the noted horticulturist of New York state, moved from Iowa to Little Traverse Bay when he was four, in 1874. Until 1888 he lived among the Indians and early white settlers of the region, recounting much of the lore of his youth in *The Land of the Crooked Tree*, published in 1948. (Chapters 12 and 22 emphasize the native vegetation of the region; of greater historical interest, perhaps, are the references to species in cultivation and to weeds around the villages.) A valuable account of the region from the Indian point of view was written by Chief Blackbird (1887), who supplies a great deal of historical and traditional material which could be useful in considering the possible introduction of species. (*Cf.*, for example, the observation by Hedrick

[p. 135] suggesting an Indian origin for *Prunus nigra* in the region and Blackbird [pp. 92–93] on an Ottawa pilgrimage to the St. Lawrence River.) Many Indian legends and some early history in the area are also given by Wright (1917).

Some fascinating reading may be found in a little pamphlet, "History of Cheboygan and Mackinac Counties," published by Robinson and Sprague in 1873, at which time a number of the first settlers of Cheboygan were still living. With more local pride than historical accuracy in dating, Robinson and Sprague, in discussing Cheboygan County, state (p. 12):

> Mackinaw city, located at the Straits, is the oldest settlement in Michigan,[45] and while the southern portion of the State was a wilderness which no white man had yet penetrated, Mackinaw was a missionary point and the home of the trader. . . . and the time is yet within the memory of the living when Chicago came to this point for her supplies.

Of more botanical interest in this pamphlet is the account of the first days of lumbering in Cheboygan County. According to its authors, the first tree cut near the mouth of the Cheboygan River was in August of 1844, ". . . but no permanent settlement was made in the county outside of old Mackinaw until 1846, when Mr. Sammons built the first house . . . and occupied it with his family" (p. 17). A few other settlers promptly followed, and a water sawmill was set up that year. "McArthur, Smith & Co. . . . shipped the first lumber from the Cheboygan river in the fall of that year to parties in Chicago, consisting of 500,000 feet lumber" (p. 18). In the spring of 1847, a steam sawmill was established at the mouth of the river, and one million feet of lumber were cut and shipped to Chicago. In 1867, there were still only four million feet of lumber cut, but then lumbering increased rapidly, until in 1872 six sawmills in Cheboygan cut 35 million feet. The railroad was expected soon to reach the village.

Pine went first, and then the hardwoods, as northern Michigan was stripped of its timber. Gibson (1944, p. 24) writes:

> Lumber was still king in Cheboygan through the first half of the nineties, but the rate at which timber was cut doomed it to an early decline. The year 1896 probably marked the peak of lumber production in Cheboygan. The estimated annual output of the 16 mills in the county for that year was 200 million board feet of lumber. But timber was becoming more scarce in the interior, and a part of the production of lumber had begun to be obtained by rafting logs across from the Upper Peninsula and from Canada. (It was estimated that 40 million board feet of lumber or about ⅕ of the output, was rafted from Canada in 1897.)

In the wake of the lumbermen came fires, and the repeated burnings of some areas must be taken into consideration by the ecologist. Extensive and severe forest fires burned whatever pine, if any, had been untouched by the lumbermen, and little of the hardwood forest was left. Bogs and other wet ground habitats were not exempt from cutting and burning, but usually suffered less severely. According to Gates (personal communication) major fires of recent years have occurred in 1892, 1901, 1911, and 1923. Only a very negligible amount of logging is carried on today, and fires of any size have been unknown for the last quarter

[45] More accurate is the contradictory statement on p. 39: ". . . the mixed Canadian and Indian settlement of Point St. Ignace . . . was the second place settled in the State of Michigan, the Sault being the first."

of a century, thanks in part to modern protection measures. Probably no true virgin forest remains today, although there are some good hardwood tracts which have apparently remained more or less intact since removal of the best pine in the first days of lumbering. Gleason (1923) gives a very good general description of the vegetation of the region at the end of the period of fires and lumbering.

A study by Gibson (1944) of socio-economic evolution in Cheboygan, 1890–1940, gives a considerable amount of economic and cultural information of interest in interpreting the history of the area. Some references to lumbering in the county are contained in the bulletin on Michigan log marks edited by Allen (1941). The "Historical Sketch" of Cheboygan County in a report by the Historical Records Survey (1938, pp. 3–11) includes a general history of the Mackinac region as well as specialized information on the county organization, with a bibliography. A soil survey for the county has been published by the U. S. Department of Agriculture (Z. C. Foster, *et al.*, 1939). There is little such concise historical and background material available for Emmet County, with the exception of a paper on farmsteads and land types (including maps) by Fred W. Foster (1942). The works previously cited by Blackbird, Hedrick, and Wright (as well as a number of others) present material of a historical nature for the region, particularly Emmet County, in a semi-popular or less critical fashion. For the sake of bibliographic thoroughness, attention should also be called to two recent reports on the surface geology of the region (Spurr & Zumberge, 1956; Zumberge, 1956) and to the geological report which emphasizes sub-surface features (Landes, Ehlers, & Stanley, 1945).

The 1950 census lists the areas of the two counties and the amount of land in farms as follows:

	Emmet Co.	*Cheboygan Co.*
Approximate area (acres):	295,040	464,000
Land in farms (acres):	120,527	125,331
Land in farms (%):	40.9	27.0

These figures are only broadly suggestive of conditions of cultivation, for they would not include the numerous abandoned farms, and they do include uncultivated land within farm boundaries. According to the census figures, on the Emmet County farms, 53,347 acres are in woodland, of which 29,071 are pastured. On Cheboygan County farms, 59,376 acres are woodland, of which 36,716 are pastured.

In addition to the land in farms, several thousand acres are occupied by towns, villages, and other developments, and there are also roads and railroads which occupy land no longer covered with native vegetation. It would be impossible to give a meaningful estimate of the total area now relatively undisturbed by human activities.

REASONS FOR REJECTION OF SPECIES RECORDS

The following discussion of the various reasons for which species once reported from a region must be deleted from the cumulative record is based primarily on

experience with the flora of the Douglas Lake region. The general principles, however, are applicable to any similar floristic work, and it seems valuable to summarize them.

Had Gates ever undertaken to revise the list prepared by himself and Ehlers, he would doubtless have applied essentially the same criteria as indicated below, for they are summarized in his own list of the "Flora of Kansas" (Kansas State Coll., Agric. Exp. Sta., 1940): "Earlier lists of plants contain numerous names which are not repeated in the present list. These names were based on misidentifications, unavoidable when the study of taxonomy in Kansas was new. When specimens of these early collections were preserved, reidentification has made it possible to include them under the proper name." Regarding the Douglas Lake flora, Gates wrote me in 1953: "Some of the species which were recorded were based on [specimens which] I never had a chance to see. In the early days, also, we had no chance to compare with herbaria and doubtless some of the early identifications were mistakes; in fact, we know that some were."

In preparing a new list of the higher plants of the Douglas Lake region, the basic principle has been to admit only those species which are supported by a herbarium specimen which I have examined. Every effort has been made to locate specimens to support published records. The simplest reason, therefore, for removal of a species from the list is that no voucher specimens have been found. Or the specimens on which the original report was based may be misdetermined; in such a case, the correct identification for the plant may fall into either of two categories: It may represent a species not previously reported from the region, in which case, in effect, one name is substituted for another—*not a synonym*—in the list; or it may be the same as a species previously reported, in which case the list decreases by one.

It may be, of course, that the specimen (if there ever was one) on which a published report was based has been redetermined and thus was not located in searching herbaria for voucher specimens. Such species would then be listed below as lacking vouchers rather than with the more technically precise information that the vouchers are misdetermined. In those herbaria which were not examined completely, I have attempted to locate bases for records under related and superficially similar species as well as under those originally reported.

Except in cases of particular interest, no mention is made of the fact if the original vouchers are apparently missing or misdetermined when other specimens support the inclusion of a species on the regional list. In other words, even though the name of a species is not removed from the list in the notes below, it does not necessarily follow that the exact data accompanying the original published report are still to be taken as correct. At the present time, the aim is to bring the single list for the two-county region up-to-date. A species may have been reported for Emmet County, for instance, years ago, and no specimens supporting that particular record may exist; if a more recent collection from Cheboygan County does exist, no "addition" or "subtraction" to the *regional* list is being made at this time, although this information is in my files. Much additional work will be necessary before a complete, new annotated list with individual county records and statements of distribution and ecology can be prepared.

In the fall of 1953, a list of all species which Gates and Ehlers had reported from the region but for which vouchers had not yet been found was sent to Dr. Gates, upon his suggestion. He looked for specimens of these in the herbarium of Kansas State College, and transferred the ones which he found to the Biological Station herbarium. No further regional vouchers, therefore, are to be expected at Kansas, and the transferred specimens are now incorporated into the Station herbarium.

A second main category of changes consists of those resulting from revised taxonomic concepts of the material involved. When the published records for a region extend over the period of a century, a number of "extra" names may accumulate as species limits are redrawn by later students and as nomenclatural changes are made. Changes in the list resulting solely from nomenclatural alterations, as can be easily deduced from the synonymy given in manuals, are not treated below as deletions, nor are the new names treated in a companion paper as additions. If a former species concept has been split into two or more entities of specific rank, however, it would seem useful to indicate which is now considered to occur in our region. If a name once used is still in use but for a different species (*e.g.*, *Solidago uliginosa*), it has often seemed well, to help avoid confusion, to clarify our material below.

My own taxonomic prejudices will be apparent as reports for some species (*e.g.*, in *Amelanchier*) are considered below to be equivalent to reports for others. In such cases, no extensive effort has been made to locate voucher specimens for the entities which some authors have considered as distinct. (If, for example, I am unable to distinguish *Panicum tennesseense* from *P. implicatum*, I could hardly attempt to check for authentic specimens of both in the region.)

Generally speaking, the list below is concerned only at the species level. Reports, as species, of entities which I consider good varieties in line with present concepts are not considered as subtractions from the regional flora if they are supported by specimens, although the end result will be to reduce the sum total of *species*—including all their varieties—in the flora. Neither has the separation of old species into varieties been considered as creating additions to the list. If an entity reported as a distinct species (*e.g.*, *Muhlenbergia ambigua*) does not even constitute, according to modern treatments or at least in my own opinion, a variety worth recognizing, it is generally listed below as a means of disposing of the record. For example, the names of *Potamogeton lucens* and *P. angustifolius* as formerly applied by American authors are now both discarded in favor of *P. illinoensis*.

The third general reason for discarding published records is that the species should not be considered as established in the flora of the area. This is a matter into which some difference of opinion may enter, and in which the inadequacy of old labels plays a part.

It is frequently the custom in modern floras to exclude species collected as obvious waifs or as escapes from cultivation, if these are not thoroughly established. This practice has much to commend it, but cannot be as consistently applied to old specimens, inadequately labeled, as it can to one's own collections. I have sought to include on the accepted list only those species which so far as is known are growing without cultivation and in sites where never cultivated. (An aban-

doned shade tree or perennial garden plant in its original location is not considered in any way a part of the established flora.) Data accompanying much herbarium material are not very explicit on this point, and if neither the information in a published report nor on a label indicates that the plant was in cultivation, it has seemed best to leave it, at least tentatively, on the list. On the other hand, some species in the Gates and Ehlers list (and other lists) were clearly stated to be in cultivation, and there is no more reason for continuing to consider these as part of the flora than for adding the other dozens of known but unlisted cultivated plants.

Plants collected once or twice as obvious escapes from cultivation or as waifs along a railroad or highway (perhaps here adventive from their indigenous range elsewhere) are considered as belonging on the list if there is no evidence that they were planted in the places where found. Although it is usual to exclude such waifs from local lists, a more useful practice would be to include them—with, of course, an indication of their status at the time of the list. The first specimen of many a now common weed must once have been considered a waif in the region. It is impossible to prophesy now which of such plants will one day become established and which will die out. Likewise, it is difficult to designate a time limit after which a waif, if not again collected, should be excluded from the official list of the flora. A few species reported 40 years ago as weeds in the yard of a lumber mill, for instance, may never again be collected. But some rare native species may also be locally extinct. Some introduced and some native species once thought to have been eliminated in the region have again been discovered, however, so the only consistent way to deal with these plants has been simply to accept *all species for which there are authentic specimens in herbaria so long as there are no data on the label (or in published statements) indicating that the collection represented a population growing under cultivation or directly persisting from cultivation*. Published records of species not meeting this criterion are included in the list which follows.

LIST OF REJECTED SPECIES RECORDS

Listed below are those species reported for Emmet and/or Cheboygan counties in published literature which for one or more of the reasons presented in the preceding section cannot be maintained on the list of the local flora—as well as a few others on which comment seems desirable. Infraspecific entities, whether or not specimens have been encountered, are generally not discussed. Papers primarily of an ecological, historical, or popular nature have not been considered but (with a few exceptions in the literature before 1909) only those whose main purpose is to give distributional records. The ecological papers by Gates and his students, for instance, reflect the nomenclature and determinations upon which the Gates and Ehlers list was based, and these records will have been evaluated in the latter connection. One of the main functions of the present list, however, may be to suggest to ecological workers what interpretation may be made of questionable records.

The list does not include species found misdetermined in herbaria, if the

erroneous name has not been published for the region. Nor does it include species on the Fallass and Swift manuscript list if these have not subsequently been quoted in published papers by others. (About 40 species were listed by Fallass and Swift for which specimens were not found in the Fallass herbarium [correctly or incorrectly determined], but which would be new regional records if located; about 30 species listed by Fallass and Swift would have been new records, but the specimens were found to be misdetermined.)

Herbaria whose resources have to a greater or lesser extent been drawn upon are the following, listed with the standard abbreviations of the Index Herbariorum, ed. 2 (Lanjouw & Stafleu, 1954), or proposed for ed. 3 (Stafleu, *in litt.*, 1956). Not all of these are cited in the discussion of excluded species, nor in the companion paper on additions to the regional flora; but there should be placed on record here the nature of the herbarium resources which support (if only in a negative way) the two papers.[46]

ALBC: Albion College, Albion, Michigan
BLH: Cranbrook Institute of Science, Bloomfield Hills, Michigan
GH: Gray Herbarium, Cambridge, Massachusetts
KSC: Kansas State College, Manhattan, Kansas
MICH: University of Michigan, Ann Arbor, Michigan
MO: Missouri Botanical Garden, St. Louis, Missouri
MSC: Michigan State University, East Lansing, Michigan
OC: Oberlin College, Oberlin, Ohio
SDC: South Dakota State College, Brookings, South Dakota
UMBS: University of Michigan Biological Station, Cheboygan, Michigan
US: United States National Herbarium, Washington, D. C.

Initials have been used to designate the most frequently cited collectors: J. H. E. (John H. Ehlers); F. C. G. (Frank C. Gates).

When no other reference to a published report is supplied, the Gates and Ehlers list (1925) or its supplementary lists of additions (1928, 1931, & 1948) may be assumed, the latter being indicated respectively by the presence of "A-I," "A-II," or "A-III" in parentheses. An additional reference to Gates (1913) is usually not given if the rejected species appeared again in the 1925 list. Also, if a record in a later published work (*e.g.*, Billington, 1949) is ob-

[46] I have examined all collections in UMBS in the course of the present study, and also, through the kindness of Dr. William J. Gilbert, all in ALBC. All species reported from the region (no matter by whom) but not found in UMBS have been looked for in MICH and MSC. Species reported on the authority of Beardslee, Kofoid, or Gates have in addition been looked for in OC. Species reported by Billington and by Walpole have been looked for in BLH. This has, in general, been the minimum pattern of my own examination, but some additional searching has been done in all herbaria cited above, especially MICH. Dr. Frank C. Gates has looked in KSC for representatives of all species reported by himself and Ehlers for which I had not found regional vouchers in UMBS, MICH, or MSC; all which he found were transferred to UMBS. Dr. Grady L. Webster has kindly looked in GH for Beardslee & Kofoid records (unsuccessfully), and a few other specific ones. Prof. C. A. Taylor has generously sent me notes on all northern Michigan material in SDC. Jason R. Swallen has looked for several records, chiefly Gramineae, in US. To Dr. George B. Van Schaack I am indebted for searching in MO for species reported by S. M. Coulter.

viously based on Gates and Ehlers, such later quotations therefrom are not itemized.

When no additional comment is made after referring to a published record, it may be assumed simply that the specimens have not been found on which the report was based (and that no other specimens substantiate the record for the region).

Species are listed below alphabetically within each family, the order of families following that of *Gray's Manual*, ed. 8 (Fernald, 1950). Names are given as first reported, followed in brackets by the appropriate name, if different, of the *Manual* (or by a discussion of the names involved). References to lists (*e.g.*, Beal, 1905) in which the species are numbered cite these species numbers rather than page numbers. Authors of binomials are not given for old synonyms or names used in error.

Equisetum littorale [*E.* × *litorale* Rupr. (pro sp.)]

The only specimen found which was labeled as *E. litorale* [Barnum in 1913, UMBS] is *E. arvense*.

Equisetum

Probably because of nomenclatural problems, two superfluous names were listed by Gates and Ehlers in this genus. Their list included *E. praealtum* [= *E. hyemale* var. *affine*] (A-II), *E. hyemale* var. *intermedium*, and *E. robustum* [= *E. hyemale* var. *robustum*]; also listed was "*Equisetum hyemale*" without designation of a variety. Only the three varieties already listed are indigenous in eastern North America. They also listed as new to the region (A-II) *E. kansanum*, which is merely the later name for what their original list had apparently included under the name of *E. laevigatum*. (We do have in our flora all four entities to which Gates & Ehlers applied these six names.)

Dicksonia punctilobula [*Dennstaedtia punctilobula* (Michx.) Moore]

Listed by Winchell (1861, p. 316) from "Bear Creek, Emmet Co.," and this report (as "Petoskey") was subsequently quoted in the three state lists by Wheeler & Smith (1881, No. 1613), Beal & Wheeler (1892, No. 1721), and Beal (1905, No. 28). For lack of any supporting specimen, the record was quite properly omitted from Billington's *Ferns of Michigan* (1952). E. J. Hill, in a discussion of the distribution of this species (*Fern Bull. 18:* 67–71. 1910), reported botanizing for several days in Petoskey and vicinity in 1878, "some of the time along Bear Creek, the stream Winchell names as the special locality, but I did not meet with it, though ferns of several kinds were plentiful in the region."

Dryopteris fragrans (L.) Schott

Mention was made in Billington (1952, p. 181) of a Cheboygan County specimen, "not typical material," attributed to this entity in the New York Botanical Garden. A more recent inquiry from the Cranbrook Institute of Science revealed that the specimen in question cannot now be located at New York. Possibly it is now filed under a correct determination; the record, as indicated in Billington, was dubious to begin with.

Woodsia obtusa (Spreng.) Torr.

In view of the rarity of this species in Michigan (*cf.* Hagenah, 1955, p. 69) and its omission from our region in Billington (1952), it is perhaps well to note that the material upon which Gates and Ehlers based their Cheboygan County report (A-I) is referred to *Cystopteris fragilis*. The species remains on the list for the Douglas Lake region, however, on the basis of a recently discovered collection by Branson A. Walpole (No. 1567) from Bay View, Emmet Co., Aug. 12, 1923 [BLH No. 24662].

Sparganium acaule [*S. chlorocarpum* var. *acaule* (Beeby) Fern.]

Although treated as a variety of *S. chlorocarpum* by Fernald, it is doubtful whether this form deserves even that much recognition. Our material is, at best, intermediate between typical plants and the extreme state to which the name *acaule* is usually applied.

Sparganium androcladum

Reported (A-III) with "*S. americanum androcladum*" given as a synonym, so that this record should be included with *S. americanum* as now understood and as previously reported by Gates & Ehlers. The binomial *Sparganium androcladum* now refers to the species formerly called *S. lucidum* (see below).

Sparganium lucidum [*S. androcladum* (Engelm.) Morong]

The only specimen [UMBS *ex* KSC] labeled as this is evidently *S. chlorocarpum* Rydb.

Potamogeton angustifolius
Potamogeton lucens

Both of these names as applied by American authors are now discarded in favor of *P. illinoensis* Morong for American plants.

Potamogeton dimorphus [*P. spirillus* Tuckerm.]

Reported from Lancaster Lake. The only specimen found under this name is from Smith's Bog [Prescott in 1945, UMBS], and has been determined by E. C. Ogden as *P. gramineus* L. var. *gramineus*.

Potamogeton interior

Reported (A-II) in addition to *P. filiformis* Pers., from which it is not now considered distinct.

Potamogeton interruptus

Cited by Oosting (1932, p. 169) from Cheboygan County, but as treated by Fernald this is not a species distinct from *P. pectinatus* L.

Potamogeton pusillus

This name as used by Gates & Ehlers and by Oosting (1932, pp. 167–168) applies to what is now called *P. berchtoldii* Fieber (not *P. pusillus* L., which is thus far unknown in our region). "*P. pusillus* var. *major*" of E. J. Hill (1881) is *P. friesii* Rupr.

Sagittaria cristata Engelm.

I am following Pierce (in Gleason, 1952) and Bogin (*Mem. N. Y. Bot. Gard. 9:* 208–213. 1955) in not considering *S. cristata* specifically distinct from *S. graminea* Michx. If recognized as *S. graminea* var. *cristata* (Engelm.) Bogin, it may be the only variety of the species in our region.

Philotria angustifolia [*Elodea*]
Philotria nuttallii [*Elodea*]

Gates & Ehlers, following Britton & Brown (1913), considered *P. angustifolia* as distinct from *P. nuttallii* and *P. canadensis*, which they also listed. Although *angustifolia* is not now considered distinct from *nuttallii*, Gates & Ehlers cited *Elodea canadensis* as a synonym of both! In any event, all material examined from the region is referable to *Elodea canadensis* Michx. Specimens labeled as *E. nuttallii* by Ehlers have leaves fully as wide as in *E. canadensis*, and it seems best to consider their sessile staminate flowers as representing immature material in which the spathe has not yet elongated.

Agropyron

Records for *A. caninum* (A-I), *A. subsecundum* (A-III), and *A. tenerum* (as well as older reports of *A. richardsonii*) may all be referred to *A. trachycaulum* (Link) Malte *sens. lat.*

Material from our region belongs to var. *glaucum* (Pease & Moore) Malte and var. *novae-angliae* (Scribn.) Fern., according to N. W. Katz.

Alopecurus geniculatus L.

All material found is *A. aequalis* Sobol. Jason R. Swallen writes me (1956) that there is no material in US from the counties under consideration.

Bromus breviaristatus Thurb. (not Buckl.) [*B. catharticus* Vahl]

Cited under this name in Beal (No. 331) and Beal & Wheeler (No. 1641) was doubtless what had been mentioned by Wheeler & Smith (No. 1510) as "the most peculiar form" of *B. ciliatus*. The material on which this report was evidently based is *B. inermis* Leyss. subsp. *pumpellianus* (Scribn.) Wagnon var. *purpurascens* (Hook.) Wagnon[47] [Wheeler in 1879, MSC].

Bromus hordaceus glabrescens [*B. racemosus* L.]

Reported (A-II) at the same time as "*Bromus hordaceus*" [= *B. mollis*], but no collections with the varietal name can be found. The only Michigan records known to N. W. Katz are from Wayne, Washtenaw, St. Clair, and Ingham counties. Swallen informs me that there is no material from the Douglas Lake region in US.

Bromus purgans L.

The plants (Temperance Point, 1921) mentioned by Gates & Ehlers are *B. inermis* subsp. *pumpellianus* (Scribn.) Wagnon var. *purpurascens* (Hook.) Wagnon,[47] perhaps crossed with typical *B. inermis* Leyss.

Chaetochloa italica [*Setaria italica* (L.) Beauv.]

The only collection discovered [UMBS; MICH] is from cultivation west of Pellston, although Gates & Ehlers also reported the species as "Found in a burnt-over area." Mentioned by Winchell (1861, p. 315) as being cultivated by the Indians in Emmet Co.

Cinna arundinacea L.

Reported by Gates (1913, p. 86) from the west shore of Douglas Lake. The material was presumably *C. latifolia* (not listed in 1913, but included instead of *C. arundinacea* in his later work), but could not be located under either name in herbaria.

Festuca ovina L.

All of the previously published reports for this species were evidently based on what is now known as a native species, *F. saximontana* Rydb. A 1931 Petoskey collection by Fallass does, however, support the occurrence of the introduced *F. ovina* in the region (*cf.* Voss, 1957).

Koeleria cristata (L.) Pers.[48]

Reported (A-II) solely on the basis of specimens (which did not survive) transplanted from the Sleeping Bear dunes in Leelanau County. The species is known from dunes in neighboring Presque Isle County to the east, and from jack pine plains in Otsego County to the south, but continued searching has thus far failed to reveal it in Emmet or Cheboygan counties.

Lolium temulentum L.

Reported (A-III) on the basis of Harvey (1940, p. 44), but specimens to support this plausible record have not been located.

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[47] *Cf.* Wagnon in *Rhodora 52:* 211 (1950) and *Brittonia 7:* 465 (1952).

[48] Shinners (*Rhodora 58:* 94. 1956) suggests that *K. macrantha* (Ledeb.) Spreng. is the correct name for the plant currently known in America as *K. cristata*.

Muhlenbergia ambigua [*M. mexicana* f. *ambigua*]
Muhlenbergia umbrosa [*M. sylvatica* Torr.]

The plants found [UMBS; MICH] labeled as *M. sylvatica* are referred to *M. mexicana* (L.) Trin. f. *ambigua* (Torr.) Fern., which is not deserving of the specific rank accorded it in the Gates & Ehlers list.

Panicum boscii Poir.

Reported (A-II) from Colonial Point, but the material found is referable to *P. latifolium* L. According to Swallen (*in litt.*, 1956), no specimens from the region are in US.

Panicum huachucae
Panicum lindheimeri
Panicum tennesseense

These three species were reported by Gates and Ehlers, in addition to *P. implicatum*. I am tentatively following Shinners (*Amer. Midl. Nat. 32:* 168 & 178. 1944) in including Great Lakes area records for all of these under *P. implicatum* Scribn. Fernald (1950) and Gleason (1952) include them all under *P. lanuginosum* Ell., which Pohl (*Amer. Midl. Nat. 38:* 580. 1947) and Shinners consider as a coastal species; Fassett (*Grasses of Wisconsin*, 1951), following Shinners, likewise uses the name *P. implicatum* for Wisconsin material. Pohl and Fassett do take up the name *P. lindheimeri* for some plants distinguished from *P. implicatum*, and if one wishes to make this distinction, *P. lindheimeri* Nash is apparently supported by good material from both Emmet and Cheboygan counties. It might be desirable to consider this as a variety of *P. implicatum*, but this is not possible nomenclaturally without more juggling of names than would be warranted without further study. Shinners (p. 178) suggests that *P. lindheimeri* "may well be a distinct species of the southwest."

P. tennesseense, incidentally, was the only *Panicum* reported from the Douglas Lake region by Hitchcock and Chase in their monograph of the genus (*Contr. U. S. Nat. Herb. 15:* 220. 1910; see discussion under E. J. Hill in historical account above).

Panicum meridionale Ashe

Material in UMBS labeled as this has been referred to *P. implicatum* by Shinners; Katz has done the same with the material in MICH; and I would place Fallass' collections in ALBC similarly. Swallen (*in litt.*, 1956) states that there is no *P. meridionale* from the region in US.

Panicum praecocius Hitchc. & Chase

Collections labeled as this are referred to *P. implicatum* and *P. columbianum*. There is none from our region in US according to Swallen.

Panicum villosissimum Nash

I have discovered no specimens labeled as this. Swallen (*in litt.*, 1956) states that F.C.G. 13359 in US, originally labeled as *P. villosissimum*, "is *P. huachucae* Ashe." [= *P. implicatum* as treated above].

Poa caesia [*P. glauca* Vahl]

This was cited for Petoskey by Wheeler & Smith (No. 1485), but Beal & Wheeler (No. 1616) evidently refer their previous records of *P. caesia* to *P. nemoralis* L. (rather than to *P. glauca*, of which *P. caesia* is now considered a synonym).

Zea mays L.

Reported as "occasionally a waif along roadsides or more frequently along railroads." Gates (*in litt.*, 1953) informs me that "once in the Wolff's Bog a plant of corn grew and seeded. The next year little plants were present but were not persistent. Specimens were not made." No specimens have been found in support of any occurrence outside of cultivation, and I have not seen the species as a waif so far north myself.

Carex anceps

Not now considered distinct from typical *C. laxiflora* Lam.

Carex blanda Dew.

No specimens labeled as *C. blanda* have been found, and F. J. Hermann knows of none from the Douglas Lake region. Gates (*in litt.*, 1953) suggested that this "was the name used for a form of Carex laxiflora which is very common." It may, therefore, have been used for specimens of the common *C. leptonervia* Fern.

Carex brevior (Dew.) Mack.

The two collections (one from each county) in UMBS have been determined as *C. merritt-fernaldii* Mack. by Hermann. One of them (Smith 159) was, in fact, cited in the original description of *C. merritt-fernaldii* (*Bull. Torr. Bot. Club 49:* 372. 1922), along with three other collections from the Douglas Lake region, before the original Gates & Ehlers list was even published.

Carex deflexa deanei [*C. deflexa* Hornem.]

Reported by Beal (No. 475): "Mackinaw, G. H. Hicks." In Beal & Wheeler (No. 1462) the locality is spelled "Mackinac," suggesting that Mackinac Island, rather than Mackinaw City, is meant. In any event, no plants from either place have been encountered among the extensive Hicks collections transferred from the herbarium of Denison University to MICH, nor in other herbaria.

Carex laricina Mack.

Credited by Hermann (1941, p. 20) to Cheboygan Co.; he has since determined a Fallass collection from Emmet Co. I am tentatively following Fernald (1950), however, in including this in *C. cephalantha* (Bailey) Bickn., which is also cited by Hermann from Cheboygan Co. I have personally been unable to recognize the distinctions which supposedly separate the species. Gleason (1952) adopts an even more conservative course, including *C. laricina*, *C. cephalantha*, *C. sterilis*, etc., under *C. muricata* L.

Carex leersii [*C. echinata* Murr.]

The specimen [F.C.G. 15566, MICH] from Mud Lake bog referred to by Gates & Ehlers has been determined as *C. interior* Bailey by Hermann.

Carex normalis Mack.

The specimen [F.C.G. 16389, UMBS *ex* KSC] on which the Gates & Ehlers report (A-III) is based is *C. cristatella* Britt.

Carex setacea ambigua [*C. annectens* Bickn.]

The collection [J.H.E. 5158, MICH] on which the Gates & Ehlers report (A-III) was based was determined as *C. vulpinoidea* Michx. by Hermann in 1938—almost 10 years before the record was published under the erroneous name. (Also represented in UMBS and similarly determined by Hermann in 1952.)

Carex stricta Lam.

Although the present list is generally not considering infraspecific categories, since the *Carex* flora of the state has been so well worked up, it may be mentioned that all our material reported as *C. stricta* by Gates & Ehlers is referable to var. *strictior* (Dewey) Carey, which they also reported (in specific rank).

Eleocharis ovata (Roth) R. & S.

The basis of the Gates & Ehlers report [Barnum in 1913, UMBS] is *E. palustris* (L.) R. & S. var. *palustris*.

Eleocharis tenuis (Willd.) Schultes

The only collection located [East Point, UMBS] is referred to *E. elliptica* Kunth, a species not distinctly recognized in Britton & Brown (1913), whom Gates & Ehlers largely followed.

Scirpus heterochaetus Chase

No specimens were discovered in UMBS, MICH, MSC, or KSC. Gates wrote me in 1953 that a specimen had been determined as this when "sent in to Washington." Swallen (*in litt.*, 1956) states that there is no material in US. A single sheet bearing this name was at last located [F.C.G. 13162, OC], but is referred to *S. validus* Vahl by the 5 strongly barbed bristles which slightly exceed the more or less lenticular achene.

Arisaema stewardsonii Britt.

The specimen [J.H.E. 1580, MICH] on which the record was evidently based appears to be good *A. atrorubens* (Ait.) Blume [*A. triphyllum* (L.) Schott, *sens. lat.*], with deep purplish spathe and broad, oblique leaflets. There is no note as to whether the fresh spathe was fluted, and the plant does not otherwise resemble authentic material of *A. stewardsonii*.

Juncus acuminatus Michx.
Juncus longistylis Torr.

Both species were reported by Gates & Ehlers.

Allium schoenoprasum L.

The only report (A-II) is of plants in cultivation, and even this is not supported by specimens.

Erythronium albidum Nutt.

The only specimens so labeled [UMBS *ex* KSC] consist entirely of leaves. In view of the fact that only *E. americanum* Ker has been seen in flowering condition during extensive field work in May, it seems safest to refer this material to that species.

Lilium (intermediate between *canadense* & *superbum*) [probably *L. michiganense* Farw.]

No specimens exist to support the record of Gates & Ehlers (or Gates, 1913) for Reese's Bog or the Cecil Bay area. Gates wrote me in 1953 that this lily, "presumably michiganense," was present "in the clearing which Reese made next to the Burt Lake road. There were perhaps half a dozen plants, most of which were picked by Reese's relatives but I know that at least one was brought to the station in 1911 before the station herbarium was started."

Lilium umbellatum [*L. philadelphicum* var. *andinum* (Nutt.) Ker]

Reported as a distinct species, but in view of the extensive intergrading of the characteristics which supposedly distinguish it even as a variety (depth of flower color and scattered *vs.* whorled leaves), it is not useful to try to separate it from typical *L. philadelphicum* in the region.

Polygonatum biflorum (Walt.) Ell.

All plants known from the region are *P. pubescens* (Willd.) Pursh.

Polygonatum commutatum [*P. canaliculatum* (Muhl.) Pursh]

Listed by Gates (1913). His No. 372 [MSC] is *P. pubescens*; no. 179, also cited, has not been found.

Sisyrinchium graminoides [*S. angustifolium* Mill.]

First cited by Beal & Wheeler (No. 1176) as *S. anceps*, from Petoskey; Beal (No. 703) credits this record to Wheeler. Specimens have not been found.

Blephariglottis grandiflora [*Habenaria fimbriata* (Ait.) R. Br.]

The "single plant in the bog at Fontinalis Run, 1920" reported by Gates & Ehlers has not been found, although Gates (*in litt.*, 1953) states that it was brought in by a student and should have been saved.

Corallorhiza odontorhiza (Willd.) Nutt.

A "single plant in the Mud Lake Bog, 1920," according to Gates & Ehlers.

Habenaria dilatata media [*H.* × *media* (Rydb.) Rydb. (pro sp.)]

The specimen in UMBS on which Gates & Ehlers' report (A-III) was apparently based is better referred to *H. hyperborea* (L.) R. Br., as the lip is hardly dilated. The status of *H. media* is rather in doubt anyway, the entity not being recognized at all by Correll (1950). Ames (*Orchidaceae*, Fasc. IV, p. 58. 1910) considered *media* to be a green-flowered color form of *H. dilatata*. Some specimens in MICH from the Douglas Lake region originally labeled as *H. hyperborea* have been annotated as *media* by Fuller and later as *dilatata* by Correll.

Liparis lilifolia (L.) Lindl.

The material [UMBS *ex* KSC] from Mud Lake Bog on which the Gates & Ehlers report was based was determined as *L. loeselii* (L.) Rich. by Correll in 1943.

Populus italica [*P. nigra* var. *italica* Muenchh.]

Planted, but hardly reproducing or spreading.

Salix amygdaloides Anderss.

The basis of the report (A-II) is referred to *S. fragilis* L., at least as defined by Ball (in Gleason, 1952),[49] or to a hybrid of that species with *S. alba* L. It is probable, therefore, that the tree from which the material was collected had been planted; so that *S. fragilis* ought not to be added to the list in replacement of *S. amygdaloides*, which could conceivably have been indigenous with us.

Salix candida × *S. discolor*

No material has been found to support the records (A-II, A-III), although Gates (*in litt.*, 1953) stated that specimens had been determined by Ball.

Salix cordata Michx.

Billington (1949, p. 71) has a dot in Emmet Co. on his distribution map of this species, which, following Fernald, he distinguishes from *S. syrticola*. Very possibly this is based on some specimen determined as *S. cordata* by Ball, who does not separate the two.

Salix pyrifolia Anderss.

Listed by Gates & Ehlers on the basis of a 1910 report by Loew, without specimens. Gates informed me (*in litt.*, 1953): "We have not been able to find anything like it in the area in which Loew collected, so believe the identification was not correct."

Salix sericea Marsh.

Credited to the region by Beal & Wheeler (No. 1093), Beal (No. 806), Gates & Ehlers, and Billington (1949, p. 81). However, as pointed out by Walp (1935, p. 235), these willows from our region should be referred to *S. subsericea* (Anderss.) Schneid. *sensu* C. R. Ball.

Carya (probably *C. glabra* [Mill.] Sweet)

Regardless of the species, the report (A-III) is of planted trees. No *Carya* other than planted specimens is known in the region.

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[49] The petioles are glandular, the leaves glaucous beneath, and the capsules definitely pedicelled.

Juglans cinerea L.
Juglans nigra L.
Like the preceding, *Juglans* is known only from planted trees.

Betula (possibly *B. lenta* L.)
Reported by Gates (1913) from the gorge; his specimen [F.C.G. 464, MSC], although sterile, is apparently (by pubescent twigs) *B. lutea* Michx. f., a species common in the area. The only material in support of the Gates & Ehlers record is a collection [J.H.E. 959] in fruiting condition from the gorge in 1920 and labeled as *B. allegheniensis*; it is clearly referable to *B. lutea*. Gates (*in litt.*, 1953) said of this record: "Ehlers says there were a few of this sweet smelling tree below the head of the gorge about 1920. I knew of but one but so far as I know herbarium specimens were not made and the engineers destroyed all of the trees in this area."

Corylus americana Walt.
Billington (1949, p. 89) places a dot in Cheboygan Co. on his distribution map of this species, but the basis for his record is unknown.

Castanea dentata (Marsh.) Borkh.
Reported (A-II) as planted southwest of Brutus. The same tree (or one in a similar location) has been relocated; it is a large tree (over 2 ft. d.b.h.) in an orchard, and must certainly have been planted.

Quercus rubra L.
This was reported in addition to *Quercus borealis* [*Q. rubra* var. *borealis* (Michx. f.) Farw.], but all specimens known are referable to var. *borealis*.

Quercus velutina Lam.
Material from the jack pine plains previously identified with *Q. velutina* seems better placed as *Q. ellipsoidalis* Hill or as *Q.* × *palaeolithicola* Trel. [*Q. ellipsoidalis* × *Q. velutina*]. (*Cf.* Voss, 1957.)

Ulmus fulva [*U. rubra* Muhl.]
Reported by Gates (1913); his specimen [F.C.G. 227, MSC] is sterile, the leaves more or less harsh above and the youngest portion of the branchlet pubescent. In the absence of any later reports or confirming material in fruit, it is best to refer this to *U. americana* L., which is the only native elm known thus far in the region, although many trees do differ somewhat from typical *U. americana* in foliage and twig characters.

Ulmus pumila L.
Reported (A-III) as a planted tree.

Persicaria setacea [*Polygonum setaceum* Baldw.]
The specimens found [UMBS; MICH] are *P. hydropiperoides* Michx. (det. L. H. Shinners & F. J. Hermann).

Polygonum douglasii Greene
Material [UMBS] on which the report (A-III) was based is *P. ramosissimum* Michx. (det. L. H. Shinners).

Polygonum stevensii Brenckle
F.C.G. 19582 was determined as this by Brenckle and so reported (A-III), but a portion of the collection examined [UMBS *ex* KSC] does not appear to differ significantly from *P. ramosissimum* Michx.

Rumex occidentalis [*R. fenestratus* Greene]
Specimens labeled as this are lacking.

Rumex patientia L.

Reported (A-II) as a weed near Bryant's, but the material is referable to *R. crispus* L.

Rumex verticillatus L.

Listed by Coulter (1904, pp. 42 & 68) from the "Walloon River" [Bear Creek] area near Petoskey.

Amaranthus hybridus L.

The Fallass collection referred to by Gates & Ehlers came from an old field near Harbor Springs, 1913. It has been annotated by Sauer in 1956 as "Probably F_1 A. tuberculatus × A. retroflexus."

Portulaca grandiflora Hook.

No specimens have been located, although the species "was found occasionally along roads" (Gates, *in litt.*, 1953).

Arenaria leptoclados

This "species" would now be considered as a variety (var. *tenuior* Mert. & Koch) of *A. serpyllifolia* L., which was also reported by Gates & Ehlers, but it so intergrades with the typical variety that it seems hardly worth recognizing.

Cerastium longipedunculatum [*C. nutans* Raf.]

Reported by Gates & Ehlers from "railroad ballast"; Gates (*in litt.*, 1953) says "was a weed in gardens."

Silene conica L.

Mentioned (Voss, 1952, p. 51) on the basis of material which later examination showed to be *Dianthus armeria* L.

Nymphaea advena [*Nuphar advena* (Ait.) Ait. f.]

All material on which the Gates & Ehlers report is based should be referred to *N. variegatum* Engelm. "*N. advena* var. *minus*" [*N.* × *rubrodiscum* Morong] which Beardslee & Kofoid collected in Long Lake, Cheboygan Co. (Beal & Wheeler, No. 51; Beal, No. 978) is probably only small *N. variegatum*. The material [OC] consists of one sheet with four leaves and a second with one leaf and an old flower.

Batrachium trichophyllum [*Ranunculus trichophyllus* Chaix]

Plants of section *Batrachium* from the Douglas Lake region in MICH and UMBS have been examined by W. B. Drew, who has referred all of them to *R. longirostris* Godr. (including J.H.E. 1141, cited by Robertson, 1941, p. 35, as *R. trichophyllus*). No material could be found in OC on which the Beardslee & Kofoid report was based (Beal & Wheeler, No. 14; Beal, No. 1029).

Ranunculus flabellaris Raf.

The collection cited for Emmet Co. by Robertson (1941, p. 36) is *R. gmelinii* DC. [C.O. Erlanson 335, UMBS, MICH].

Ranunculus hispidus Michx.

The only collection located which was labeled as *R. hispidus* [F.C.G. 302, MSC] is *R. recurvatus* Poir. (achenes 2 mm. long, including hooked beak).

Podophyllum peltatum L.

Reported by Gates & Ehlers on the basis of "a specimen found in a beech-maple forest by B. E. Quick in 1911." The locality was the "Burt Lake hardwoods" north of Colonial Point, according to Dr. Gates (personal communication), who was unable to relocate the species there when he looked for it himself. Quick's specimen was apparently not saved, and

one wonders whether perhaps even so distinctive a plant as *Podophyllum* could have been confused with something else. Note, for example, that Nuttall long ago (1818, ii: 165) called attention to the fact that in *Petasites palmatus* "The leaves considerably resemble those of *Podophyllum peltatum*." I have looked with particular care for *Podophyllum* in the region for several years, and have never seen it in spring or summer. The species is not on the Fallass & Swift manuscript list.

Arabis canadensis L.

No specimens have been encountered to support the listing by Gates & Ehlers, which was not quoted by Walpole (1927).

Arabis hirsuta (L.) Scop.

Walpole (1927, p. 237) indicates that he examined an Emmet Co. collection made by Wheeler in 1890. This collection [MSC] is *A. glabra* (L.) Bernh. There are no vouchers for the Emmet Co. report by Fallass, quoted by Walpole.

Arabis laevigata (Muhl.) Poir.

The collection cited by Gates & Ehlers (A-I) from west of Bryant's in 1923 has not been found. A specimen from north of Sedge Point [UMBS *ex* KSC] is *A. divaricarpa* Nels.

Brassica nigra (L.) Koch

The 1936 Emmet Co. collection cited by Gates & Ehlers (A-III) has not been found. A Cheboygan Co. specimen from Mackinaw City is *Erucastrum gallicum* (Willd.) O. E. Schulz; another from Ingleside is *B. kaber* (DC.) L. C. Wheeler. The only Emmet Co. material found is a 1924 collection by Fallass [ALBC], which may be referred to *B. juncea* (L.) Coss.; Walpole, however, (1927, p. 345) referred to an earlier collection by Fallass which he had examined, as well as one by Wilbur Smith.

Camelina sativa (L.) Crantz

Walpole (1927, p. 316) states that he examined material from both counties collected by Fallass. None has been discovered, although the species was on the Fallass & Swift list as having been seen by both authors.

Cardamine bulbosa (Schreb.) BSP.

Walpole (1927, p. 339) states that he examined an Emmet Co. collection by Fallass, who had confirmed Swift's inclusion of it on the manuscript list; but there is no material (correctly or incorrectly identified) in ALBC.

Cardamine douglassii (Torr.) Britt.

Again, Walpole (1927, p. 339) states that he examined an 1896 Emmet Co. collection by Fallass. This species was not even included on the Fallass & Swift list.

Cardamine hirsuta L.

There are no specimens of any *Cardamine* in OC collected by Beardslee or Kofoid in Cheboygan Co. Their report (Beal & Wheeler, No. 69; Beal, No. 1080; quoted by Walpole, p. 340) was probably based on *C. pensylvanica* Muhl.

Cardamine parviflora L.

Another Beardslee & Kofoid record (Beal, No. 1081; quoted by Walpole, p. 340).

Diplotaxis muralis (L.) DC.

Ehlers' Cheboygan Co. material has not been found. The Bay View collection by Fallass which is mentioned by Gates & Ehlers is actually an *Erysimum*.

Lepidium perfoliatum L.

Walpole (1927, p. 324) states that he examined an Emmet Co. specimen collected by Fallass. There are none in ALBC.

Lunaria rediviva L.

Walpole (1927, pp. 342-343) lists as the only Michigan collection one by Fallass in Emmet Co., 1916. The material [ALBC] is referred to *L. annua* L. by its sessile upper leaves.

Sinapis alba [*Brassica hirta* L.]

Included by Gates & Ehlers on the basis of a report by Gleason that this species was a "weed near Bryants, 1917." (*Cf.* Gleason, 1918, p. 82.) Gleason (*in litt.*, 1956) states that he did not collect and press any specimens in 1917.

Radicula obtusa [*Rorippa obtusa* (Nutt.) Britt.]

A single specimen originally labeled as this species [UMBS] is a *Barbarea*.

Sophia incisa [*Descurainia richardsonii* (Sweet) O. E. Schulz]

Specimens from both localities specified by Gates & Ehlers (incl. A-II) are *D. pinnata* (Walt.) Britt. var. *brachycarpa* (Richards.) Fern. (including Ehlers' 1920 collection mentioned as examined by Walpole, 1927, p. 326).

Drosera longifolia [*D. anglica* Huds. *fide* synonymy of Gates & Ehlers]

Material on which this report was based has not been encountered; it is quite possible that it was the hybrid of *D. linearis* and *D. rotundifolia*, recently described in detail by Wood (1955) from the region.

Sempervivum tectorum L.

Reported (A-I) as "undoubtedly escaped from cultivation" from woods east of Lancaster Lake. Gates "never made specimens" (*in litt.*, 1953).

Parnassia palustris L.

Reported (Beal, No. 1136) from Harbor Point on authority of C. A. Davis. No specimen has been found in MICH, in which Davis' herbarium is now incorporated, but the basis is evidently a sheet in MSC [No. 40775] correctly labeled as *P. parviflora* DC. It is from Harbor Point and bears one of Davis' labels, on which he crossed out his own name as collector and substituted "V. M. Hathaway."

Grossularia oxyacanthoides [*Ribes oxyacanthoides* L.]

All material from the region is referable to *R. hirtellum* Michx. as now understood.

Penthorum sedoides L.

Reported (Beal & Wheeler, No. 382; Beal, No. 1123) by Beardslee & Kofoid from Cheboygan Co., but there are no specimens to support this in OC. It was also on the Fallass & Swift list, but unsupported by specimens in ALBC. Such a distinctive species could hardly have been misdetermined, and it should be looked for in the region.

Ribes gracile [*R. missouriense* Nutt.]

Billington (1949, p. 105) includes a dot on his distribution map in each county along the shore from Bay Co. to Cheboygan Co. Since he uncritically accepted all published records in making these maps, Billington probably based this positive indication of distribution on the more general observation by Dodge (1921, p. 47): "from Bay County to Mackinaw City, Cheboygan County." There is also a sterile specimen from Douglas Lake in MICH originally labeled as *R. cynosbati* and later annotated "R. gracile ? J. H. E." This specimen [J.H.E. 1588] was annotated by Fassett in 1933: "R. missouriense Nutt. (R. gracile) Placed in this species by fringed petiolar hairs and large spines."

I have collected vegetative and very young flowering material from plants which would be placed as *R. missouriense* by the spines and fringed hairs, but fruit from the same shrubs is more or less bristly. I am tentatively referring all this material to *R. cynosbati* L. until satisfactory specimens are found with unarmed fruit. (*Cf.* also Clayberg, 1920, p. 44, where under *R. cynosbati* "transitions to *R. gracile*" are noted in our region.)

Ribes odoratum Wendland f.

Reported as cultivated, and there are no specimens.

Ribes rubrum [*R. sativum* Syme]

Credited to Cheboygan Co. (Beal & Wheeler, No. 381; Beal, No. 1146) on authority of Beardslee & Kofoid. Their specimens [OC] are all *R. triste* Pall.

Amelanchier bartramiana (Tausch) Roemer

Walp (1935, p. 241) states that "This species has not yet been found in the pure state" in the Douglas Lake region, and then, on inference from presumed hybrids, proceeds to indicate it as a new record from both counties. The species has still not been found in the region Most of the hybrids, including *A. "bartramiana* × *laevis"* (A-III) have been placed by McVaugh as *A. interior* Nielsen. Distribution records in Billington (1949, p. 133) were doubtless taken from Walp.

Amelanchier intermedia Spach

This name was never used by Gates & Ehlers or Walp in their papers, but Billington includes a dot in each county of our region on his distribution map (1949, p. 131). The species is not maintained by Jones (1946) and I have seen no specimens which would fit it as treated by Fernald (1950).

Amelanchier humilis Wieg.
Amelanchier huronensis Wieg.
Amelanchier stolonifera Wieg.

The treatment by G. N. Jones (1946), largely followed by Gleason (1952), is a usable and applicable one for *Amelanchier* in our region. Following of it has reduced to synonymy some of the species previously reported by Gates & Ehlers, Walp, and Billington. *A. spicata, A. humilis* (A-I, A-II), and *A. stolonifera* (A-III) were all reported by Gates & Ehlers; the latter two are included in *A. spicata* (Lam.) K. Koch *sensu* Jones. It should be mentioned, however, that all material from our region is probably *A. stolonifera* if one wishes to distinguish it.

A. sanguinea and *A. huronensis* (A-III) were reported; all of the specimens from our region may be what is called *A. huronensis* by those who distinguish the two, but following Jones it is included under *A. sanguinea* (Pursh) DC. (Similar changes hold, of course, for the hybrids reported from the region, except for those which are referred to *A. interior*.)

Aronia arbutifolia [*Pyrus arbutifolia* (L.) L. f.]

Reported by Gates & Ehlers and by Walp. All specimens appear to be *A. prunifolia* (Marsh.) Rehd. [*Pyrus floribunda* Lindl.]; it is doubtful whether true *A. arbutifolia* occurs as far inland as Michigan.

Crataegus boyntonii Beadle

A species known from nowhere near Michigan. Walp (1935, p. 240) states that "specimens collected from the Wildwood jack pine plains are very close to this species." Perhaps he had in mind what Gates reported as *C. lucorum* (see below).

Crataegus crus-galli L.

Walp (p. 61) cites Fallass & Swift's manuscript, and his report is doubtless the basis of the Emmet Co. dot on Billington's map (1949, p. 137). There are no specimens in ALBC.

Crataegus douglassii Lindl.

Since Billington examined the collections in ALBC, his map dot in Emmet Co. (1949, p. 147) is presumably based on a collection by Fallass labeled *C. douglassii*. With red fruit and large spines, however, the specimen does not fit the description of Billington (or others). It is *C. brainerdii* Sarg. (det. confirmed by E. J. Palmer).

Crataegus laurentiana Sarg.

The basis of Walp's report (p. 240) for this Quebec species in Cheboygan Co. is completely unknown. Fallass had included it on the manuscript list for Emmet Co.; his material is *C. chrysocarpa* (det. confirmed by Palmer).

Crataegus punctata Jacq.

Billington (1949, p. 139) has a dot in Cheboygan Co. on his distribution map for this species. Since all other counties along the shore south to Bay Co. also contain dots, it is probable that he was freely using the rather general statement of Dodge (1921, p. 48) for this shore: "In open ground or woods throughout."

Crataegus roanensis

Listed by Walp (p. 240) and Gates & Ehlers, in addition to *C. macrosperma* Ashe, of which it is, at best, a variety. (Most of the material of *C. macrosperma* from the region has been placed in var. *roanensis* by Palmer.)

Dalibarda repens L.

Listed by Coulter (1904, pp. 42 & 66) as occurring in the vicinity of "Walloon River" [Bear Creek] at Petoskey.

Fragaria grayana [*F. virginiana* var. *illinoensis* (Prince) Gray]

The single collection [UMBS *ex* KSC] is certainly referable to *F. virginiana* as now understood, perhaps to var. *illinoensis*, which, as noted by Gleason, intergrades with the typical variety.

Geum macrophyllum Willd.

The only material [UMBS] labeled as this species is *G. aleppicum* Jacq. var. *strictum* Fern. There are no specimens in OC as a basis for Beardslee & Kofoid's record (Beal & Wheeler, No. 314; Beal, No. 1188).

Geum triflorum Pursh

No specimens have been found to support the listing by Gates (1913, p. 94).

Geum vernum (Raf.) T. & G.

The only collection labeled as *G. vernum* [UMBS *ex* KSC] is from West Maple River, as reported, but is *G. rivale* L.

Rosa carolina L.

Billington (1949, p. 179) places a dot in Cheboygan Co. on his distribution map for this species. The only record in the literature on which this could be based is the tentative one by Erlanson (1926, p. 91) which she herself later corrected (1928, p. 113; 1929, p. 453) when describing *R. schuetteana* (see below). (Older records for *R. carolina* apply to *R. palustris*; what now is called *R. carolina*—and what Erlanson reported—was formerly known as *R. humilis*, but no specimens of this species have been found for our region.)

Rosa michiganensis
Rosa schuetteana

Both species were described by Erlanson (1928) from Douglas Lake, and listed by Gates & Ehlers (A-II) and Walp (p. 239). It was later suggested that they are hybrids of *R. blanda* with *R. palustris* (Erlanson, 1929, pp. 453 & 496; 1934, pp. 226–227), and this interpretation has been followed by Gleason (1952, *ii*: 323). The oldest binomial for this hybrid is apparently *R.* × *palustriformis* Rydb. (pro sp.), of which *R. michiganensis* and *R. schuetteana* become synonyms.[50] *R. palustriformis* was listed for the region by Walp, although specimens with this name have not been encountered.

[50] The International Code, Article H. 1, states that "all offspring of crosses between individuals of the same parent species receive the same binary name."

Rubus canadensis L.

Reported by Gates & Ehlers (incl. A-I) on the basis of material better referred to collective species *R. orarius* Blanch. and *R. allegheniensis* Porter as defined by Gleason (1952, *ii:* 310–312) than to his collective species *R. canadensis*. Also reported by Beal & Wheeler (No. 309) and Beal (No. 1156) from Cheboygan Co. on authority of Wheeler. The only Wheeler collection found [MSC] is one from Bay View (Emmet Co.), and is a sterile primocane fragment (labeled *R. millspaughii*) which can hardly be determined with satisfaction.

Rubus complex Bailey

Cited from shore of Douglas Lake [J.H.E. 3914] by Bailey (*Gent. Herb. 5:* 330. 1943). Included in collective species *R. arundelanus* Blanch. *sensu* Gleason (1952, *ii:* 308).

Rubus idaeus L.

Gates (*in litt.*, 1953) states that his No. 11601 [UMBS *ex* KSC] is what Ehlers gave him, considering it to be different from what was reported as *R. strigosus*. It appears, however, to be referable to *R. strigosus* Michx. *sens. lat.*—our native species of red raspberry.

Rubus michiganensis (Card) Bailey

Cited from Cheboygan Co. [Douglas Lake, Steidtmann] by Bailey (*Gent. Herb. 5:* 368. 1943). This *Rubus* is included in collective species *R. enslenii* Tratt. *sensu* Gleason (1952, *ii:* 310).

Rubus neglectus [*R.* × *neglectus* Peck (pro sp.)[51]]

The single sheet available [Loew in 1909, UMBS] is apparently *R. strigosus* Michx. *sens. lat.*

Rubus odoratus L.

Reported by Gates & Ehlers on the basis of a plant which was seen but never collected by Ehlers, on whose authority it was included on the list (*fide* Gates, *in litt.*).

Rubus peracer Bailey

Reported (A-II) with quotation from original description (*Gent. Herb. 5:* 492–494. 1944) of the type, from Douglas Lake. This is included in collective species *R. hispidus* L. by Gleason (1952, *ii:* 307), whose treatment of *Rubus* I am following.

Rubus signatus Bailey

A collection from Cheboygan Co. [Gleason 116] is cited by Bailey (*Gent. Herb. 5:* 93. 1941) as "probably" this species, which is included by Gleason (1952, *ii:* 308) in collective species *R. arundelanus* Blanch.

Gleditsia triacanthos L.

Reported (A-III) as a hedgerow along U. S. highway 31; the trees are clearly planted.

Lathyrus myrtifolius [*L. palustris* var. *myrtifolius* (Muhl.) Gray]

This "species" was reported in addition to *L. palustris*. As now treated by Fernald (1950), *L. palustris* var. *myrtifolius*, var. *macranthus*, var. *linifolius*, var. *palustris*, and intermediates apparently occur in our region, but it seems better to relegate the report of *L. myrtifolius* to the synonymy of the inclusive *L. palustris* than to report as additions to the regional flora the other varieties of this polymorphic species, the extremes of which are admittedly distinct. At any rate, we certainly do not have material meriting recognition as two species, as originally reported.

Trifolium procumbens L.

The collection [UMBS *ex* KSC] referred to by Gates & Ehlers is *Medicago lupulina* L.

[51] *Cf.* Bailey in *Gent. Herb. 5:* 874. 1945.

Vicia dasycarpa Ten.
The collection [MICH] cited (A-III) is *V. villosa* Roth.

Chamaesyce humistrata [*Euphorbia humistrata* Engelm.]
The specimens [UMBS, MICH] reported (A-III) are *E. supina* Raf.

Euonymus sp.
The plants thought to be a *Euonymus* were later discovered to be juvenile seedlings of *Fraxinus* (Gates, personal communication).

Aesculus hippocastanum L.
Reported (A-III) as cultivated.

Parthenocissus quinquefolia (L.) Planch.
Plants from our region should all be referred to *P. inserta* (Kerner) Fritsch.

Abutilon abutilon [*A. theophrasti* Medic.]
No specimens other than of cultivated plants have been found.

Hypericum gymnanthum Engelm. & Gray
The specimens [UMBS *ex* KSC] to which Gates & Ehlers referred are *H. majus* (Gray) Britt.

Hypericum mutilum L.
The specimens [UMBS *ex* KSC] forming the basis of the Gates & Ehlers report are undoubtedly *H. majus* (Gray) Britt., although the stamens number slightly more than 20. (This condition is permitted in Fernald's key and required in Deam's.)

Viola blanda Willd.
The range of this species as recently defined by Russell (*Amer. Mid. Nat. 54:* 491. 1955) does not include Michigan. No material has been found with the data given by Gates & Ehlers; later collections in UMBS have been referred by Russell to *V. incognita* Brain. or *V. pallens* (DC.) Brain. Credited to Cheboygan Co. on authority of Beardslee & Kofoid (Beal & Wheeler, No. 117, as var. *palustriformis*; Beal, No. 1484a, as *V. leconteana*). Their material cannot be found (under any species) in OC, but it was probably *V. incognita*. No specimens in MO support the listing by Coulter (1904, pp. 42 & 69) from the "Walloon River" [Bear Creek] area near Petoskey.

Viola hirsutula Brainerd
The specimen reported (A-II) is *V. selkirkii* Pursh (det. confirmed by N. H. Russell in 1955).

Viola papilionacea Pursh
It might be noted that all specimens previously reported from the region are referred to *V. cucullata* Ait. *V. papilionacea* may remain on the list, however, on the basis of a single collection from banks of the Upper Black River, 1955 [E.G.V. 2617] (det. confirmed by Russell in 1955).

Viola pedata L.
Reported (A-II) solely on the basis of two plants transplanted to the Biological Station from Crawford Co., to the south.[52]

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[52] Passing references in non-technical literature are not being considered in the present account, but it might be noted here that Hedrick (1948, p. 131) mentions the "bird-foot" and some other violets which probably do not occur in the Emmet County woods to which his memory attributed them.

Viola rafinesquii [*V. kitaibeliana* var. *rafinesquii* (Greene) Fern.]

Reported by Gleason (1914a, p. 147), but no specimens have been found. The plants referred to were very likely *V. arvensis*, later listed by Gates & Ehlers.

Oenothera oakesiana [*O. parviflora* var. *oakesiana* (Robbins) Fern.]

The material which forms the basis of the Gates & Ehlers report [F.C.G. 13137, MICH; *cf.* also Gates, 1923] superficially resembles specimens from the east coast—but also resembles "*O. muricata* var. *canescens*" from elsewhere around the Great Lakes. It seems best to include the collection in question with *O. parviflora* or *O. biennis*, lacking further material and a more critical examination. Wheeler (1899, p. 84) and Beal (No. 1521) reported *oakesiana* from the shores of the Great Lakes; Fernald (1950) treats it as a coastal variety; and Gleason (1952) considers it merely a densely pubescent form of *O. parviflora*.

Panax quinquefolius L.

No specimens have been found as a basis for the reports ("Fallass and Swift" and "M.A.C. identification") by Kenoyer (1924a, p. 137) from Emmet and Cheboygan counties.

Achangelica [sic] *hirsuta* [*Angelica venenosa* (Greenway) Fern.]

First reported from Emmet Co. by Winchell (1861, p. 265) and subsequently quoted (as *Angelica villosa*) in Wheeler & Smith (No. 404), Beal & Wheeler (No. 420), Beal (No. 1548), and Kenoyer (1924a, p. 150). This is an excellent example of the copying of an unverified report over and over again.

Hydrocotyle umbellata L.

No specimens have been discovered. It is of interest to note, however, that following a diagram supplied by Dr. Gates to show where McFarland reported finding this species, I discovered *H. americana* in 1955. Quite possibly it was the latter species which was originally found at the site in 1915.

Oxypolis rigidior (L.) C. & R.

The specimen on which Gates' 1913 report was based [F.C.G. 237, MSC] is *Sium suave* Walt. It was annotated to this effect by Kenoyer, who thus included it under "specimens examined" and also listed it as "reported" for the original determination, *Oxypolis* (1924a).

Sanicula canadensis L.

A Fallass & Swift record is cited by Kenoyer (1924a, p. 143), but no specimens are in ALBC.

Cornus baileyi [*C. stolonifera* var. *baileyi* (Coult. & Evans) Drescher]

I cannot see that this is more than a form [f. *baileyi* (Coult. & Evans) Rickett, if it is to be named] of *C. stolonifera*, as treated in Gleason (1952).

Erxlebenia minor [*Pyrola minor* L.]

Kenoyer (1924b) says "Reported from Cheboygan Co. (F. C. Gates)," but Gates evidently never published such a report.

Andromeda polifolia L.

Credited by Billington (1949, p. 255) to Emmet and Cheboygan counties, in addition to *A. glaucophylla* Link, but there is no evidence that any species other than the latter occurs in Michigan.

Vaccinium uliginosum L.

"Reported from Emmet Co. (C. E. Barr, 1908)," according to Kenoyer (1924b, p. 185); this is doubtless the source which led Billington (1949, p. 269) to place a dot in Emmet Co. on his distribution map. No specimens have been found, although many collections by Barr are in ALBC.

Steironema lanceolatum [*Lysimachia hybrida* Michx.]
Beal & Wheeler (No. 749) and Beal (No. 1640) cite this species for Cheboygan Co., as reported by Beardslee & Kofoid. Kofoid's specimens [OC] are *L. quadriflora* Sims.

Syringa vulgaris L.
Often persisting after cultivation, as noted by Gates & Ehlers, but no specimens exist to vouch for its spreading or growing from seed.

Gentiana linearis Froel.
The specimen [UMBS *ex* KSC] on which the Gates & Ehlers report was based is immature, but is referred to *G. procera* Holm by its long, pointed, rough-keeled involucral bracts.

Apocynum medium Greene
This species is probably a hybrid between *A. androsaemifolium* L. and *A. cannabinum* L., but all the material on which the report was apparently based can be referred without difficulty to the parent species.

Borago officinalis L.
Specimens are lacking.

Lappula texana [*L. redowskii* (Hornem.) Greene]
The only specimen found is F.C.G. 490 [MSC], which is *L. myosotis* Moench [*L. echinata* Gilib., *nom. illeg.*].

Mertensia paniculata (Ait.) G. Don.
The specimens on which the report (A-I) was based are *Cynoglossum boreale* Fern.

Blephilia hirsuta (Pursh) Benth.
Listed by Gates (1913, p. 99); his no. 410 [MSC] is actually *Satureja vulgaris* (L.) Fritsch.

Lamium album L.
The only specimen [UMBS] so labeled is *Galeopsis tetrahit* L.

Lycopus virginicus L.
Reported (A-III) from shore of Burt Lake, and by Coulter (1904, pp. 42 & 67) from the Petoskey area, but no specimens have been located.

Monarda fistulosa L.
This was listed by Gates & Ehlers in addition to *M. mollis*, to which [as var. *mollis* (L.) Benth.] all our material is referred.

Salvia nemorosa Crantz
The collection referred to by Gates & Ehlers (A-II) is *S. officinalis* L.

Stachys arenicola Britt.
The specimen on which the report (A-I) is based is *S. palustris* L.

Teucrium canadense L.
This was listed in addition to *T. occidentale* Gray. All material from the Douglas Lake region in MICH and OC has been examined by McClintock and has been annotated by her as *T. canadense* var. *occidentale* (Gray) McClintock & Epling; specimens in UMBS and elsewhere may be similarly referred. We do not seem to have two entities in our flora.

Lycopersicum lycopersicum [*L. esculentum* Mill.]
No specimens have been found, although it was reported as "seldom escaping."

Nicotiana rustica L.

First listed for Emmet Co. as in cultivation by the Indians (Winchell, 1861, p. 286). This record subsequently quoted by Wheeler & Smith (No. 875), Beal & Wheeler (No. 839), and Beal (No. 1825). No specimens, even for this record of cultivated plants, seem to exist.

Physalis sp.

The specimen which Gates & Ehlers had not referred to a species has been determined by McVaugh as *P. subglabrata* Mack. & Bush.

Solanum tuberosum L.

No specimens from cultivation or as a waif, except for my no. 2738 from a rubbish heap, where obviously dumped; this is insufficient evidence to retain the species on the list.

Castilleja pallida septentrionalis [*C. septentrionalis* Lindl.]

No specimens have been found to support the statement (A-III) of its occurrence west of Cecil in 1936. An old sheet (1916) labeled as this is referred to *C. coccinea* (L.) Spreng.

Veronica anagallis-aquatica L.

All of our records should be referred to *V. catenata* Pennell, *fide* determinations (as *V. connata*) by Pennell in MICH. [*V. comosa* of Fernald, 1950; *V. salina* of Gleason, 1952; *cf.* Burnett in *Watsonia 1:* 349–353. 1950.]

Catalpa speciosa Warder

Reported only as a cultivated tree.

Galium concinnum T. & G.

Specimens have not been found.

Galium wirtgenii F. Schultz

The collection cited (A-III) is *G. verum* L.

Lonicera glaucescens [*L. dioica* var. *glaucescens* (Rydb.) Butters]

Not clearly distinguished from *L. dioica*, also listed.

Symphoricarpos occidentalis Hook.

The material reported (A-III) is *S. albus* (L.) Blake.

Triosteum perfoliatum L.

Beardslee & Kofoid saw one plant near Black Lake, as reported by Beal & Wheeler (No. 470) and Beal (No. 1935). It was evidently not collected [not in OC].

Viburnum pubescens [*V. rafinesquianum* Schultes]

Said by Dodge (1921, p. 67) to occur in dryish open woods in Cheboygan Co., but specimens have not been encountered. This record is doubtless the source of Billington's dot for the county on his map (1949, p. 305).

Campanula uliginosa Rydb.

Doubtfully distinct from *C. aparinoides* Pursh. If deemed worthy of varietal status, the oldest name for this plant is *C. aparinoides* var. *grandiflora* Holzinger (considerably antedating var. *uliginosa* (Rydb.) Gleason). I am indebted to Richard M. Brown for calling this name to my attention and allowing me to examine the type of Holzinger's plant, which was on loan from US. Brown places all material from the northern Great Lakes region in var. *grandiflora*.

Antennaria neglecta Greene

Reported as found in 1915. The only specimens so labeled are two sheets from 1909 and 1912, both of which may be referred to *A. neodioica* Greene.

Anthemis arvensis L.

The specimens have long stout rootstocks, hardly like the annual *Anthemis*! They are *Artemisia pontica* L.

Artemisia annua L.

The specimens on which the reports (incl. A-II) were based are referred to *A. biennis* Willd.

Artemisia canadensis Michx.

Although not listed by Gates & Ehlers, there are a number of old reports for this species in the region (Winchell, 1861, p. 274; Wheeler & Smith, No. 608; Beal & Wheeler, No. 638; Beal, No. 2206; also mentioned by Nuttall, 1818, *ii:* 141, "near Michilimakinak"). The separation of this species from *A. caudata* Michx. is not at all clear in our region, and the best procedure may be to include them both under *A. campestris* L., as did Hall & Clements. In the absence of convincing material of *canadensis*, I am calling all Artemisias of this group in our region *A. campestris* var. *caudata* (Michx.) Palmer & Steyerm. (Note that Deam, 1940, p. 1102, referred Indiana reports of *A. canadensis* to *A. caudata*, considering the former to be a plant of far northern regions.)

Artemisia ludoviciana Nutt.

Material has not been found on which the reports by Gates (1913, p. 102) or Gleason 1914b, p. 512) were based. Two later collections (1916) labeled as this in UMBS are *A. absinthium* L.

Artemisia stelleriana Bess.

No material seems to exist of plants other than those in cultivation.

Aster azureus Lindl.

No specimens have been located on which the report by Gates (1913, p. 102) might have been based.

Aster hirsuticaulis

Not distinct from *A. lateriflorus* (L.) Britt.

Aster multiflorus [*A. ericoides* L.]

The only specimen [UMBS *ex* KSC] has been determined as *A. lateriflorus* (L.) Britt. (atypical) or possibly *A. lateriflorus* × *A. simplex* Willd. by Shinners in 1955.

Aster novae-angliae L.

Available specimens are *A. puniceus* L. except for F.C.G. 21352, cited (A-III) for Emmet Co., which may be referred to *A. lucidulus* (Gray) Wieg. There is no material in ALBC to support the record by Fallass as indicated (E*) by Gates & Ehlers.

Aster tradescanti L.

The only specimen located [UMBS *ex* KSC] is a robust plant of *Erigeron strigosus* Muhl. Fallass' material has been determined as *A. ciliolatus* Lindl. by Shinners in 1953.

Aster umbellatus Mill.

Reported by Beal & Wheeler (No. 565, as var. *pubens*) and Beal (No. 2124, in *Doellingeria*) for Cheboygan Co. on the authority of Beardslee. No material is in OC.

Aster undulatus L.

Aster vimineus Lam.

Both these species were reported by Beal & Wheeler (Nos. 547 & 555) and Beal (Nos. 2111 & 2112) for Cheboygan Co., but no material from Beardslee or Kofoid can be found in OC.

Bidens comosa (Gray) Wieg.
No collections have been seen.

Bidens connata Muhl.
No specimens in determinable condition have been found. One sheet [UMBS *ex* KSC] lacking mature fruit may be correct—at least it would be *B. tripartita* L. *sensu* Cronquist in Gleason (1952) and hence either *B. comosa* or *B. connata*. Besides the Gates & Ehlers report, this species was listed by Coulter (1904, pp. 42 & 65) from the "Walloon River" [Bear Creek] area near Petoskey.

Carduus odoratus [*Cirsium pumilum* (Nutt.) Spreng.]
Reported by Beal (No. 2235) as occurring in Cheboygan Co., according to Beardslee & Kofoid. Beal distinguished this species from *C. hillii* (Canby) Fern., with which Beal & Wheeler (No. 663) had more correctly identified Michigan material. The only collection in OC (by Kofoid) is from sand hills of Presque Isle Co.; it is *C. hillii*.

Erigeron pulchellus Michx.
The basis for this report [F.C.G. 370, MSC] is referred to *E. philadelphicus* L.

Eupatorium purpureum L.
All records are referred to *E. maculatum* L.

Helianthus hirsutus Raf.
The basis of this report (A-III) has been determined as *H. giganteus* L. by R. W. Long in 1956.

Helianthus scaberrimus [*H. laetiflorus* var. *rigidus* (Cass.) Fern.]
The collection [UMBS] has been referred by Shinners to *H. laetiflorus* var. *subrhomboideus* (Rydb.) Fern.

Helianthus tuberosus L.
One sterile sheet in UMBS with data other than those of the Gates & Ehlers report is labeled as this (correctly?).

Hieracium gronovii L.
The only specimen discovered [J.H.E. 4877, MICH] has hardly narrowed achenes and is probably only *H. venosum* L.

Hieracium paniculatum L.
Reported by Gates & Ehlers and by Gleason (1914a, p. 14). The only specimen [UMBS] is referred to *H. venosum* L.

Lactuca pulchella (Pursh) DC.
Reported by Gates & Ehlers as found by Gleason in 1911. Gleason (*in litt.*, 1956) states that he collected and pressed no plants in 1911, has no recollection of seeing *L. pulchella* in the Station area, and assumes that some plant brought in by him was determined by Gates.

Liatris scariosa (L.) Willd.
This was mentioned by Dodge (1921, p. 68) as occurring north "to Mackinaw City, Cheboygan County," implying it to be indigenous. Our only record is of an obvious railroad waif along the tracks at Topinabee [J. M. Calwell in 1934, UMBS]. This specimen, as well as native material from farther south in the state, may be called *L. novae-angliae* (Lunell) Shinners var. *nieuwlandii* (Lunell) Shinners.

Silphium laciniatum L.
Silphium terebinthinaceum Jacq.

These two species were reported as persisting after cultivation in a garden (*cf.* also Gates, 1913, p. 102) and later (A-I) said to have died out. They did not spread or reproduce themselves. Gates' material of *S. terebinthinaceum* was cited as "introduced" by Perry in 1937 (*Rhodora 39:* 294).

Solidago riddellii Frank

Winchell (1861, p. 272) reported this species for Emmet Co. Although he also recognized *S. ohioensis* Riddell and *S. houghtonii* Gray, the plant thought to be *S. riddellii* was probably one of the other two similar species.

Solidago rigidiuscula [*S. speciosa* var. *angustata* T. & G.]

Also reported from Cheboygan Co. as *S. erecta* in Beal (No. 2047), apparently referring to the type collection of *S. jejunifolia* Steele. All material from the region previously identified as *S. speciosa* Nutt. has been determined by Shinners as *S. speciosa* var. *jejunifolia* (Steele) Cronq., which appears to be the best name to apply to this common goldenrod of our jack pine plains. Fernald (1950) recognizes *S. jejunifolia* as distinct from *S. speciosa*; however we treat them nomenclaturally, we do not have two entities in the Douglas Lake region.

Solidago sp. ("nearest to *S. houghtonii*")

The basis for this listing (A-II) is not known. *S. houghtonii* had already been reported from the region in the original Gates & Ehlers list.

Solidago uliginosa Nutt.

Because of the nomenclatural problems involved, it may be helpful to mention older reports of certain Solidagos, although none in this group are to be excluded from the flora. Old reports (including Gates & Ehlers) for "*Solidago uliginosa*" should be referred to what is now called *S. purshii* Porter. Old reports (including Beal, No. 2058) for *S. purshii* (or *S. humilis*) should be referred to what is now called *S. racemosa* Greene, in which I am including what from our region, at least, have sometimes been considered separate species: *S. gillmani* (Gray) Steele and *S. randii* (Porter) Britt.; the latter is the oldest name if these are formally united. What now is called *S. uliginosa* was formerly known as *S. neglecta*, and although not reported for the Douglas Lake region in previous literature, has been collected in both counties (*cf.* Voss, 1957). (Note, however, that Cronquist, in Gleason, 1952, and *Rhodora 49:* 70–73. 1947. does not differentiate between *S. uliginosa* and *S. purshii*.)

Xanthium sp.

The material referred to by Gates & Ehlers from Big Stone Bay has not been found. A 1941 collection from Cheboygan Co. by Gates is *X. strumarium* L. *sensu* Cronquist in Gleason, 1952 (*cf.* Voss, 1957).

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